



7142

REPORT OF SAMPLING ACTIVITIES

AND ANALYTICAL RESULTS

RICHARDSON FLAT TAILINGS

SUMMIT COUNTY, UTAH

TDD F08-8903-06 - PAN FUT0039HDA

EPA ID UTD980952840

SITE ABSESSMENT

EPA REMEDIAL PROJECT MANAGER: THOMAS BURNS

& E PROJECT OFFICER: KEVIN MACKEY

PREPARED BY: KEVIN MACKEY

REVIEWED BY: KAM HOAT

SUBMITTED TO: JANET LINER, FIT-RPO

THOMAS BURNS, NPL COORDINATOR

DATE SUBMITTED: OCTOBER 13, 1989

TABLE OF CONTENTS

LIST	OF FIGURES A	ND TABLES	i
1.0	INTRODUCTION	••••••	1
2.0	OBJECTIVES	•••••	1
3.0	3.1 Locatio	n and Site Descriptions	2
4.0	4.1 Geology 4.2 Hydroge	, HYDROGEOLOGY AND HYDROLOGY	3 4
5.0	5.1 Sample 5.1.1 5.1.2 5.1.3	IVITIES Collection Tailings Samples Surface Water Samples Sediment Sample Collection	5 6 8
	5.2 Quality 5.2.1 5.2.2 5.2.3 5.2.4 5.2.5 5.2.6	Control	9 9 9 0 0
		tation1	
6.0	FIELD OBSERV	ATIONS1	1
7.0	7.1 Sedimen	RANCE REVIEW	2
8.0	8.1 Tailing8.2 Surface8.3 Sedimen	ESULTS	3 4 5
9.0	SUMMARY AND	CONCLUSIONS17	7
10.0	REFERENCES		9

APPENDICES

APPENDIX A SAMPLE COLLECTION AND SHIPMENT INFORMATION

APPENDIX B SAMPLING PHOTO LOG

APPENDIX C QUALITY ASSURANCE REVIEW

Fransferred into Supplemental Site Frispection Report Submitted 12/20/19

S. Kanady

LIST OF FIGURES

FIGURE 1 SITE LOCATION MAP

FIGURE 2 SAMPLE LOCATION MAP

FIGURE 3 CONCENTRATIONS OF ARSENIC AND LEAD IN TAILINGS SAMPLES

FIGURE 4 CONCENTRATIONS OF ARSENIC AND LEAD IN SURFACE WATER SAMPLES

FIGURE 5 CONCENTRATIONS OF ARSENIC AND LEAD IN SEDIMENT SAMPLES

LIST OF TABLES

TABLE 1 SURFACE WATER FIELD DATA

TABLE 2 SOIL AND SEDIMENT FIELD DATA

TABLE 3 INORGANIC ANALYTICAL RESULTS FOR TAILINGS SAMPLES

TABLE 4 INORGANIC ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

TABLE 5 INORGANIC ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES

SUPP SI

SAMPLING ACTIVITIES AND ANALYTICAL RESULTS REPORT

RICHARDSON FLAT TAILINGS

SUMMIT COUNTY, UTAH

TDD F08-8903-06 - PAN FUT0039HDA

EPA ID UTD980952840

1.0 INTRODUCTION

This report was prepared to satisfy the requirements of Technical Directive Document (TDD) FO8-8903-06, issued to Ecology and Environment, Inc.'s Field Investigation Team (FIT) by the Region VIII office of the U.S. Environmental Protection Agency (EPA). This report details sampling activities and provides a discussion of analytical results for samples collected during this follow up site investigation (SI) at Richardson Flat Tailings in Summit County, Utah. The follow-up work was designed to support EPA efforts to respond to comments on the nomination of the site to the National Priorities List under the current Hazard Ranking System.

The FIT performed the field work from July 18 through July 20, 1989. FIT members conducting this investigation included Kevin Mackey, project officer; Steve Yarbrough, site safety officer and Dan Kenney, sampler. Site access was coordinated by Tom Burns of EPA and Regional Gouncil. Sampling procedures used during this investigation conform to requirements established in the Region VIII Standard Operating Procedures for Field Operations at Hazardous Waste Sites (SOP III-2 E & E 1989). The sampling effort was conducted under the approved Sampling Plan (TDD F08-8903-06).

2.0 OBJECTIVES

The objectives of the follow-up field activities at Richardson Flat Tailings were to:

pull together all responses to

- o Define the surface water drainage patterns throughout the site Comments area:
- o Verify a release of inorganic contaminants into Silver Creek;

o Identify source material contributing to metals contamination in Silver Creek.

All of the aforementioned objectives were addressed during the July 18 through July 20, 1989 sampling effort. However, the exact source of metals contamination has not been verified.

3.0 BACKGROUND

3.1 LOCATION AND SITE DESCRIPTION

Richardson Flat Tailings lies within the northwest quarter of Section 1 and the northeast quarter of Section 2, Township 2 South, Range 4 East, Salt Lake Meridian, in Summit County, Utah. The tailings cover an area of approximately 160 acres on a topographic depression located one and one-half miles northeast of the town of Park City (Figure 1).

The mill tailings at Richardson Flat came from the Keetley Ontario Mine and other metal mining operations currently owned by United Park City Mines (UPCM). The most recent use of the area for tailings disposal was from 1975 to 1981. During that time UPCM had all its mining properties leased to either Park City Ventures or Noranda Mining, Inc. who constructed and operated milling facilities on UPCM properties. In May of 1974, the Utah Division of Health - Water Pollution Committee approved plans by Park City Ventures to construct an embankment, dikes and a diversion ditch to contain mill tailings deposited on Richardson Flat.

3.2 PREVIOUS WORK

ST'insp

The original FIT site investigation at Richardson Flat Tailings was conducted during the summer of 1985. One background monitoring well was installed by the FIT as part of the investigation. The background well and two existing UPCM wells located at the base of the dam were sampled. In addition, six surface water samples, one surface soil sample, two subsurface soil samples, four surface tailings samples and four subsurface tailings samples were collected during the 1985 sampling effort. Findings of the original field investigation are discussed in the Report of Sampling Activities (TDD R8-8505-27) and the Analytical Results Report (TDD R8-8508-07).

In July, 1986 the FIT conducted high-volume air sampling at the site. A report of air sampling activities (TDD R8-8605-12) and an analytical results report for air sampling (TDD R8-8608-05) provide details of field work and data results.

The FIT submitted a Hazard Ranking System (HRS) package for Richardson Flat Tailings on September 3, 1987. Based on documented observed releases of inorganic contaminants to surface water and air, the site received an overall migration score exceeding the 28.5 threshold value required for nomination to the National Priorities List (NPL). Proposal of Richardson Flat Tailings to the NPL appeared in the Federal Register on June 14, 1988, EPA Proposal.

3.3 4.0 SITE GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

3.3. (4.1 GEOLOGY

Richardson Flat Tailings lies within a broad, gently rolling flat north of Park City, identified as Parleys Park. Over half of the total area (approximately 35 square miles) of Parleys Park is underlain by unconsolidated deposits of a poorly sorted mixture of clay to cobble size material. The unconsolidated deposits, which are saturated to within a few feet of the ground surface, occur primarily along Silver

and East Canyon Creeks and in the flats northwest of Quarry Mountain. The rest of the park is underlain by consolidated rocks including volcanics of Tertiary origin and Knight Conglomerate (Baker 1970).

2 HYDROGEOLOGY

The water sources for wells in the Heber-Kamas-Park City area are primarily consolidated rocks in the mountains and unconsolidated alluvial fill in the valleys. Few wells exist within Parleys Park, so the unconfined aquifer characteristics in the area are not well understood. There appears to be no well-defined beds of material of very high or very low permeability, and no indications of the existence of artesian conditions. The average saturated thickness of the unconfined aquifer is broadly estimated to be about 40 feet.

The general ground water flow direction corresponds with the regional surface water flow directions. Recharge to ground water in the unconsolidated deposits in Parleys Park comes from direct infiltration add Map#1

add Map#1

park

parley websit

oth Purk City of precipitation, runoff from the mountains and secondarily from subsurface inflow through consolidated rocks (Baker 1970).

HYDROLOGY

Parleys Park is drained by East Canyon Creek and Silver Creek, both tributaries to the Weber River. Silver Creek flows west of and near the northern extension of Richardson Flat Tailings, which has been channelized for irrigation purposes both upstream and downstream of the tailings. The nearest diversion from Silver Creek downstream of the tailings is the G.M. Pace ditch used for flood irrigation of alfalfa location? in 1977. fields and pasture.

A diversion ditch within the tailings has been constructed as part of the effort by Park City Ventures to contain tailings material deposited on Richardson Flat. Construction of the diversion ditch has altered the drainage pattern as depicted on the 1955 USGS topographic map (Figure 1). The diversion ditch originates east of the tailings and

terminates near the embankment at the northwest portion of the tailings. Figure 2 depicts the course of the diversion ditch as viewed on an oblique aerial photograph provided by EPA Environmental Monitoring Systems Laboratory (EMSL), dated June 1984.

Normal annual total precipitation for Richardson Flat is reported between 16 and 20 inches (Baker 1970).

1 SAMPLE COLLECTION

FIT sampling activities at the Richardson Flat Tailings began on Tuesday, July 18, 1989 and continued through July 20, 1989. The sampling team consisted of Kevin Mackey, project officer, Steve Yarbrough, site safety officer and Dan Kenney, sampler.

Samples collected during this effort were shipped on July 20, 1989 to the following Contract Laboratory Program (CLP) laboratories for analysis. Samples of tailings and surface water were shipped as low hazard environmental samples to Keystone Environmental Resources in Houston, Texas for total metals analysis under Regular Analytical Services case number 12334. However, due to contractual difficulties Keystone Environmental performed only mercury analysis on these samples. Under the direction of the Sample Management Office (SMO) these samples were shipped by Keystone Environmental to Silver Valley Laboratory in Kellogg, Idaho for the remainder of the analyses. Sediment samples were shipped to Silver Valley Laboratory in Kellog, Idaho under Special Analytical Service case number 4725H. These samples were sieved in an 80 mesh sieve in order to remove large gravel and organic matter prior to analysis for total metals.

Initially, the FIT proposed screening sediment samples using FASP XRF analysis for metal contaminant detection. However, during the sampling period the FIT XRF experienced operating problems and was not available to perform the analysis. The FIT opted to send a single

sediment sample from each sample location to the CLP laboratory for sieving and analysis.

1.1.1 Tailings Samples

The FIT collected a total of five tailings samples from various locations throughout the tailings impoundment, Figure 2. These samples included:

- RFT-TA-1 Eastern end of tailings between access road and diversion ditch.
- RFT-TA-2 Southern end of tailings pile between Union Pacific Railroad and diversion ditch.
- RFT-TA-3 Southwestern edge of tailings between Union Pacific Railroad and diversion ditch.
- RFT-TA-4 Flood plain tailings located mext to Silver Creek on the western edge of Union Pacific Railroad bed.
- RFT-TA-5 Downgradient-most sample along the flood plain tailings near Silver Creek.

All tailings samples were collected using a plastic scoop or a decontaminated stainless steel spoon. The FIT composited samples on a plastic sheet prior to placing them in the appropriate sample containers.

5.1.2 Surface Water Samples

The FIT collected 12 surface water samples during the course of this investigation. Two sample aliquots were collected at each station. One sample (designated by the station location number followed by an "A" designator) was filtered with a 0.45 micron filter and a barrel filter prior to preservation with nitric acid to a pH <2. The second aliquot

(designated by location number followed by a "B" qualifier) was preserved in the same manner without filtering. These samples were collected from Silver Creek located west of the tailings pond, and from a diversion ditch which conveys runoff around the tailings impoundment and from a marshy area located downgradient of the diversion ditch at the base of the tailings dam. The FIT collected one additional sample from the Pace Homer irrigation ditch which discharges into Silver Creek upgradient of the tailings impoundment. Sample locations are shown in Figure 2. Specifically, the samples included:

- RFT-SW-1 Background sample collected from the Pace Homer Ditch.
- RFT-SW-2 Sample collected from Silver Creek near the floodplain tailings.
- RFT-SW-3 Additional sample collected from Silver Creek near floodplain tailings.
- RFT-SW-4 Upgradient sample in runoff diversion ditch.
- RFT-SW-5 Samples collected from the diversion ditch at possible point of tailings entry.
- RFT-SW-6 Sample collected from point of diversion ditch discharge into marshy area.
- RFT-SW-7 Sample collected from a marshy area upgradient of the confluence with Silver Creek.
- RFT-SW-8 Sample collected from the point where Silver Creek enters marshy area.
- RFT-SW-9 Sample collected at culvert area where Silver Creek and marshy area drain under U.S. Route 40.

RFT-SW-10 Downgradient sample collected 800 feet upstream of the G.M. Pace irrigation diversion point.

RFT-SW-16 Surface water sample collected downstream of the confluence of Pace Homer Ditch and Silver Creek.

RFT-SW-17 Background surface water sample collected from Silver Creek approximately 20 feet upstream of the confluence of the Pace Homer ditch and Silver Creek.

Heavy construction activity upgradient of surface water sample locations RFT-SW-2 and RFT-SW-3 resulted in highly turbid water at the time of sampling. The turbidity in the surface water was caused by heavy machinery moving through Silver Creek and disturbing streambed material. The additional suspended sediment could result in elevated metals concentrations in the unfiltered aliquots of samples collected from these locations.

6.1.3 Sediment Sample Collection

The FIT collected sediment samples in conjunction with each surface water sample. Each sediment sample was collected immediately following surface water sample collection. Each sample was collected using a plastic scoop or a decontaminated stainless steel spoon. The FIT composited each sediment sample on a plastic sheet prior to placing the sample in the appropriate sample container.

1.1.4 Opportunity Samples

After performing a site reconnaissance the FIT selected two locations for opportunity sample collection. Additional surface water samples (RFT-OPW-1A and RFT-OPW-1B) and a sediment sample (RFT-OSE-1) were collected from a ponded seep area at the base of the tailings dam. A second opportunity sediment sample (RFT-OSE-2) was collected from a small seep area located approximately 50 feet northeast of the ponded seep area, along the face of the tailings dam (Figure 2). Flow in this

seep area was insufficient for surface water sample collection. Surface water sample RFT-OPW-1A was filtered prior to preservation with nitric acid to a pH <2.

5. QUALITY CONTROL

The FIT closely adhered to quality control procedures during the sampling activity as described in the Sampling Plan and in SOP III-2, Chapter 6.

Instruments utilized on this SI were calibrated by FIT members in the field. An Orion pH meter and a specific conductivity meter were calibrated daily and used at each surface water sample collection point. In addition, pH paper was used to determine tailings and sediment pH at each sample location. All pH, temperature and specific conductance data can be seen in Tables 2 and 3 of this report. Daily instrument calibrations can be found in the Richardson Flat logbook (TDD F08-8903-06).

All sample containers were obtained though the Sample Management Office (SMO) Bottle Repository. A rinsate blank was collected for each day of sampling and submitted to the Contract Laboratory Program (CLP) laboratory to assess quality control (quality assurance on equipment decontamination and field handling).

5. 3 5.2.3 Background Samples

The FIT collected background samples for both the Silver Creek and diversion ditch drainage. Upgradient surface water and sediment samples RFT-SW-1A, RFT-SW-1B and RFT-SE-1 were collected from the Pace Homer Ditch (an irrigation ditch which discharges into Silver Creek upgradient of the floodplain tailings area). Additional surface water and sediment

samples RFT-SW/SE-16 and RFT-SW/SE-17 were collected on Silver Creek upgradient of the floodplain tailings. Samples RFT-SW/SE-16 and RFT-SW/SE-17 were collected downgradient and upgradient of the confluence of the irrigation ditch with Silver Creek, respectively.

An upgradient surface water and sediment sample (RFT-SW/SE-4) was collected from the eastern end of the runoff diversion ditch which conveys runoff from the surrounding hills near the tailings pond (Figure 2).

5.7 5.2.4 Blank Samples

The FIT prepared a total of three blanks for this sampling effort. RFT-SW-12A, RFT-SW-12B, RFT-SW-15A, RFT-SW-15B, RFT-SW-18A and RFT-SW-18B were field rinsate blanks (prepared to check decontamination of sampling equipment).

5.5 Duplicate Samples

Samples RFT-SW-11A and RFT-SW-11B were collected as a duplicate of RFT-SW-2A and RFT-SW-2B. These samples provide verification of laboratory accuracy.

5.6 5-2:6 Decontamination Procedures

The FIT followed decontamination procedures as set forth in SOP III-2, Chapter 11 Equipment Decontamination Procedures. This procedure involved the following steps: a tap water wash, soapy water wash, triple deionized water rinse and air drying.

5.7
DOCUMENTATION

Following sample collection, all samples were handled in strict accordance with chain of custody protocol prescribed by the <u>NEIC</u>

Procedures Manual for the Evidence Audit of Enforcement Investigation by Contractor Evidence Audit Teams, April 1984 (EPA-330/9-81-003R). Table

1 of this report includes the sample identification numbers, sample tag numbers, traffic report numbers and chain of custody number. Copies of traffic reports, chain of custody records and pertinent airbills are available in TDD file F08-8903-06. The Richardson Flat logbook has a complete record of all documentation information (TDD F08-8903-06).

6.0 FIELD OBSERVATIONS

RESULTS/FINDINGS

The FIT spent three days collecting samples from the tailings and runoff features at the Richardson Flat Tailings facility. Weather conditions were favorable with no appreciable precipitation occurring during the sampling effort.

Start w/

Surface water samples RFT-SW-2 and RFT-SW-3 collected from Silver Creek were highly turbid due to heavy construction occurring approximately 200 feet upstream of the sample locations. All field observations for this sampling effort are recorded in the Richardson Flat logbook (TDD F08-8903-06).

FIT sampling activities were observed by UPCM personnel Kerry Gee and Ed Osika and consultant Bill Bullock of MSE (an environmental consulting firm from Butte, Montana). The FIT provided split samples to UPCM personnel for each sample FIT collected. Each split was treated in an identical manner to those samples FIT submitted for CLP analysis.

Samples were collected in a manner which took into account drainage patterns throughout the Richardson Flat area. The FIT collected samples in order to assess possible migration of contaminants offsite into Silver Creek and determine the presence of contaminants in these drainage areas. Additional samples were taken from two possible seep locations at the base of the tailings dam in order to assess the likelihood of contaminant migration via seeps and springs from the tailings pond area.

Two additional tailings samples were collected from the "flood plain tailings" located along Silver Creek adjacent to the Richardson 4.7

finding

Flat site. There is no containment feature associated with these areas and the tailings material could easily be washed into Silver Creek during storm events. According to plat maps obtained from the Summit County Assessor's office, these floodplain tailings are on land which is currently owned by the U.S. Department of Transportation.

1.9

The FIT collected samples from the diversion ditch around the tailings pile. These samples were taken in such a manner as to determine availability of contaminated material for transport offsite via the diversion ditch structure. In addition, these samples will help the FIT assess the integrity of runoff control structures onsite.

4.7

7.0 QUALITY ASSURANCE REVIEW

move to 5.48

The inorganic data packages were examined thoroughly by FIT chemists for compliance using EPA Functional Guidelines for Reviewing Inorganic Data and the approved Region VIII FIT CLP Quality Assurance Standard Operating Procedures (SOP). The quality assurance reports and data sheets are attached as Appendix C. The data packages were judged acceptable overall, with qualifications as follows.

7.1 SEDIMENT SAMPLES

Spike recoveries were low for antimony and thallium indicating positive results for these elements are biased low and are flagged "j", estimated. Selenium recoveries were unacceptably low and positive values are flagged "j" and undetected values are rejected, "r". Thallium and selenium data were also flagged "j" for below criteria correlation in method of standard additions. Cadmium data were flagged "j", estimated, due to percent difference in serial dilution results.

7.2 WATER AND TAILINGS SAMPLES

Samples were transferred from one CLP laboratory to another by the Sample Management Office. Mercury results are flagged "j" estimated because of missed holding times. Recoveries for thallium and selenium

were low and were flagged as described above. Lead results were flagged "j" due to duplicate results. Arsenic data were flagged "j", estimated data, due to poor correlation coefficients for MHP 517, MHP 518 and MHP 504. Arsenic and zinc solid sample results were flagged "j" due to high serial dilution results. Field duplicates showed good relative agreement. Field blanks were free of contamination above contract detection limits except that arsenic in RFT-SW-12B was detected at 12 $\mu g/1$. Incorporate in Chap.C.

8.0 ANALYTICAL RESULTS

The results of the inorganic analysis are shown in Tables 3,4 and The sampling locations and the concentrations of arsenic and lead at each sample location are depicted in Figures 3 through 5. Each figure gives relative concentrations of contaminants for each medium sampled (i.e. Figure 3 contains lead and arsenic concentrations for tailings samples. Figure 4 contains lead and arsenic concentrations for surface water samples. Figure 5 contains lead and arsenic concentrations for sediment samples).

The following is a discussion of analytical results for each medium sampled.

8.1 TAILINGS SAMPLES

Samples collected from the Richardson Flat tailings pond showed fairly constant concentrations of lead and arsenic. In particular, arsenic concentrations in tailings samples were relatively constant at approximately 200 mg/kg while lead concentrations were slightly more variable (ranging from 2580 mg/kg to 4520 mg/kg). These samples were collected from an area immediately south of the tailings pond diversion ditch. There was no effective barrier to erosional transport of this material into the diversion ditch. Contaminants detected in this material could potentially be transported via the diversion ditch into the Silver Creek drainage.

Samples collected from the floodplain tailings (RFT-TA-4 and RFT-TA-5) exhibited a higher degree of variability. Arsenic concentrations in sample RFT-TA-4 were 859 mg/kg while sample RFT-TA-5 had an arsenic concentration of 175 mg/kg. Lead concentrations were also highly variable with sample RFT-TA-5 having a lead concentration of 31,600 mg/kg while RFT-TA-4 had a concentration of 9300 mg/kg. These tailings were also susceptible to erosional transport into Silver Creek with no visible containment structure present.

8.2 SURFACE WATER SAMPLES

Analysis of surface water samples collected from Silver Creek showed significant levels of lead, arsenic and mercury. Specifically, these contaminants were detected at largest concentration in samples collected near the floodplain tailings area (RFT-SW-2B, RFT-SW-3B) and in samples collected from the upper reaches of the Richardson Flat diversion ditch (RFT-SW-4B). Elevated arsenic and lead levels in samples RFT-SW-2B and RFT-SW-3B may be due to turbidity generated by heavy construction activities upsream on Silver Creek. In all cases, the unfiltered surface water samples showed much higher concentrations of arsenic, lead and mercury than the filtered samples (samples with an "A" designation).

Arsenic, lead and zinc levels were also higher in opportunity sample RFT-OPW-1B. The FIT collected this sample from a seep area at the base of the tailings pond. Arsenic concentrations in RFT-OPW-1B were 33.1 μ g/l while lead and zinc concentrations were 68.2 μ g/l and 759 μ g/l, respectively. Mercury was not detected in significant quantities in this seep sample.

Contaminant concentrations in opportunity sample RFT-0PW-1B suggest a slight contribution to surface water contamination from the Richardson Flat Tailings area. However, a higher level of contamination was detected in Silver Creek samples (RFT-SW-2B and RFT-SW-3B). Surface water sample RFT-SW-2B had arsenic concentrations of 619 μ g/l, lead 20,000 μ g/l, mercury 11.50 μ g/l and zinc 19,300 μ g/l significantly

elevated above concentrations in background samples RFT-SW-1A and B, RFT-SW-16A and B and RFT-SW-17A and B. Sample RFT-SW-3B had elevated concentrations of arsenic 41.9 μ g/l, lead 1100 μ g/l and zinc 3790 μ g/l, while mercury was not detected. Based on these concentrations the floodplain tailings and additional upgradient sources appear to be contributing arsenic, lead, mercury and zinc to the Silver Creek drainage.

At each sample location, the unfiltered surface water samples showed higher levels of contamination indicating that a majority of the contaminants were suspended in solution. The filtered and the unfiltered surface water samples exhibit a similar trend in relative contaminant magnitudes and in the contaminants detected. Downgradient concentrations of lead, arsenic and mercury are elevated above those detected in background samples for the filtered samples.

8.3 SEDIMENT SAMPLES

Analysis of sediment samples collected from Silver Creek, the marshy area and the storm runoff diversion ditch around the tailings pond indicated significant levels of arsenic, cadmium, lead, mercury and zinc contamination in the area. The discussion focuses on arsenic since the other contaminants correlate with arsenic.

The background sediment sample collected from Silver Creek above the Pace Homer ditch confluence (RFT-SE-17) had a concentration of 555 mg/kg of arsenic. However, immediately downstream of the confluence, sample RFT-SE-16 had a lower arsenic concentrations 211 mg/kg.

Meanwhile sample RFT-SE-1 collected from the Pace Homer ditch above the confluence of Silver Creek showed an 83.2 mg/kg concentration of arsenic. These concentrations indicate an additional source of contamination upstream of the Richardson Flat tailings dam and the floodplain tailings.

Samples RFT-SE-2 and RFT-SE-3 were collected from Silver Creek near the floodplain tailings and upstream of the convergence with the marsh

area at the base of the tailings pond. These samples exhibited arsenic concentrations of 570 mg/kg and 427 mg/kg, respectively. However, these relatively large concentrations are not three times the levels detected in background samples RFT-SE-16 and RFT-SE-17. These sediments contained arsenic and lead at concentrations greater than the floodplain tailings.

Samples collected from the marsh area also showed significant concentrations of arsenic. Those sediment samples collected from the marsh area confluence with Silver Creek (RFT-SE-8 and RFT-SE-9) exhibited higher arsenic concentrations than those samples collected from the area where the diversion ditch discharges into the marsh (RFT-SE-6 and RFT-SE-7 in Figure 2). Again, arsenic values were not three times greater than those detected in the background samples.

Arsenic concentrations in the diversion ditch samples (RFT-SE-4, RFT-SE-5 and RFT-SE-6) actually decreased in a downgradient manner across the tailings pile. The highest concentration of arsenic in the diversion ditch was detected in upgradient sample RFT-SE-4, 776 mg/kg and consistently decreased in the more downgradient samples (RFT-SE-5 at 320 mg/kg and RFT-SE-6 at 261 mg/kg). These samples were collected from areas with little hydraulic gradient, low flow and without a well-defined channel. Heavy marsh vegetation was present. Samples RFT-SE-5 and RFT-SE-6 contained a large amount of decaying organic matter which may have decreased arsenic concentration.

Downgradient sediment sample RFT-SE-10 was collected 800 feet upgradient of an irrigation diversion structure on Silver Creek. This sample exhibited a low arsenic concentration, 5.4 mg/kg, suggesting a significant decrease in arsenic levels within 600 feet of RFT-SE-9, collected from the marsh, which showed much higher contamination.

The result of these analyses indicate that a majority of the elevated arsenic concentrations may be the result of contribution from additional tailings located upgradient along Silver Creek. This

occurrence indicates additional sources other than the tailings stored in the Richardson Flat tailings pond.

8.4 OPPORTUNITY SAMPLES

After careful reconnaissance of the tailings dam and the surrounding area the FIT discovered two locations which warranted additional sampling.

Samples RFT-OPW/OSE-1 and RFT-OSE-2 were collected from seep areas at the base of the tailings dam. Opportunity sediment sample RFT-OSE-1 was collected from a ponded area at the base of the tailings dam and showed elevated lead (12,500 mg/kg) and arsenic (751 mg/kg). Sediment sample RFT-OSE-2 was collected from a seep area located approximately 50 feet north of the pond area where opportunity sample RFT-OSE-1 was collected. Flow from this seep was minimal and the FIT was not able to collect a water sample. Sediment sample, RFT-OSE-2 contained the highest overall arsenic concentrations, 839 mg/kg. However, lead concentrations in RFT-OSE-2 were roughly half of those detected in RFT-OSE-1 (6900 mg/kg). These arsenic and lead concentrations exceed those found in the surface tailings samples from the Richardson Flat.

These concentrations indicate a possible loss of integrity in the tailings dam control structure. The presence of these contaminants in seep samples may indicate a contribution of contamination to Silver Creek from the tailings pond area.

9.0 SUMMARY AND CONCLUSIONS

Results ?>> Chap &

After a systematic sampling effort, the FIT detected a number of inorganic contaminants present in tailings, surface water and sediment samples collected from the Silver Creek and Richardson Flat tailings area. The surface water results are more subject to transitory changes due to turbidity than are the sediment results, although they show the same trends.

RESULTS

Arsenic, lead and mercury were detected in most of the samples. The highest concentrations of lead and arsenic were detected in upgradient samples RFT-SE-17 (555 mg/kg arsenic and 12,200 mg/kg lead) and RFT-SE-4 (776 mg/kg arsenic and 13,600 mg/kg lead). Sediment concentrations of arsenic and lead are fairly constant from upgradient sample RFT-SE-17 downstream along Silver Creek to downgradient sample RFT-SE-10. Arsenic levels range from 211 mg/kg in sample RFT-SE-16 to 590 mg/kg in sample RFT-SE-2.

Arsenic and lead concentrations may actually be fairly constant throughout the Silver Creek drainage studied in this investigation with variations in sample results possibly due to non-homogenous depositional variations in contaminated sediment material. Contribution of contaminants by the floodplain tailings that were sampled is not well understood.

Samples collected from the Richardson Flat run-off diversion ditch also showed elevated lead and arsenic contamination. However, concentrations of both compounds decrease consistently in downgradient samples. Sample RFT-SE-4, collected from the eastern upgradient end of the diversion ditch, has roughly twice the arsenic concentrations as those detected in downgradient diversion ditch samples. This may be due to the large amount of decaying organic matter present in the downgradient samples.

Samples collected from sediment in Silver Creek indicate additional sources of contamination upstream of the Richardson Flat tailings dam. However, seep and sediment samples collected from the face of the tailings dam and sediment samples collected from the diversion ditch indicate some contribution from the tailings area.

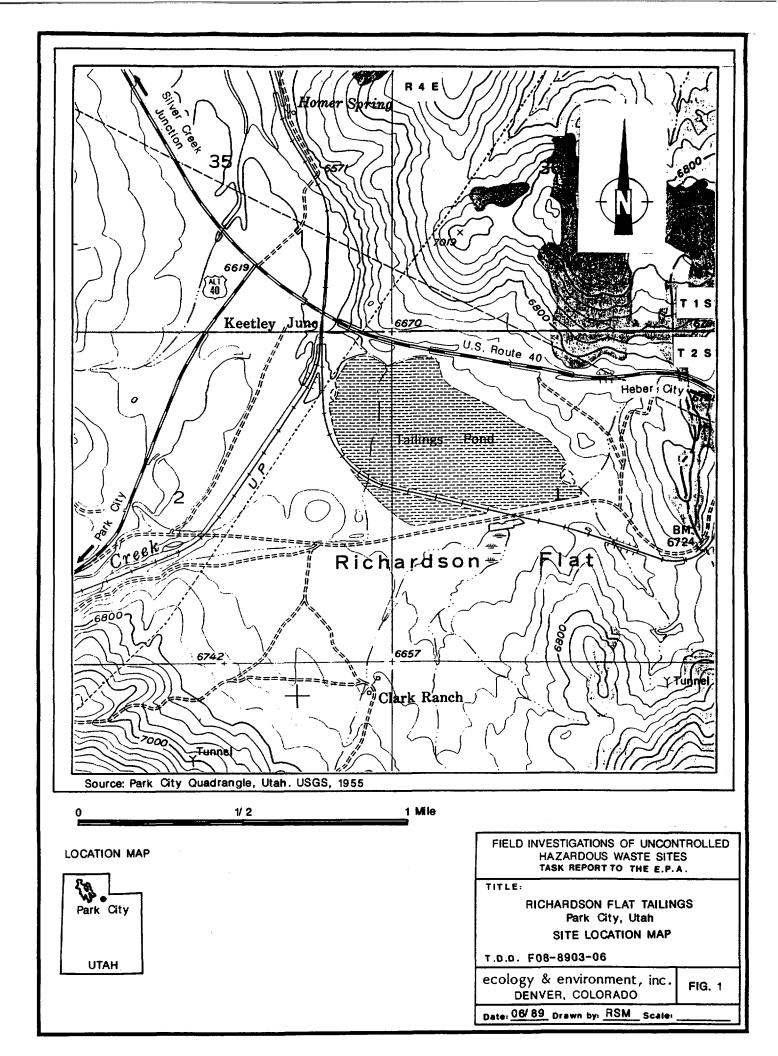
In general, the weight of the evidence indicates a substantial contaminant contribution to Silver Creek by sources upgradient of the Richardson Flat tailings area. Additional contamination is migrating from the Richardson Flat tailings area and could also be affecting water quality in the Silver Creek drainage.

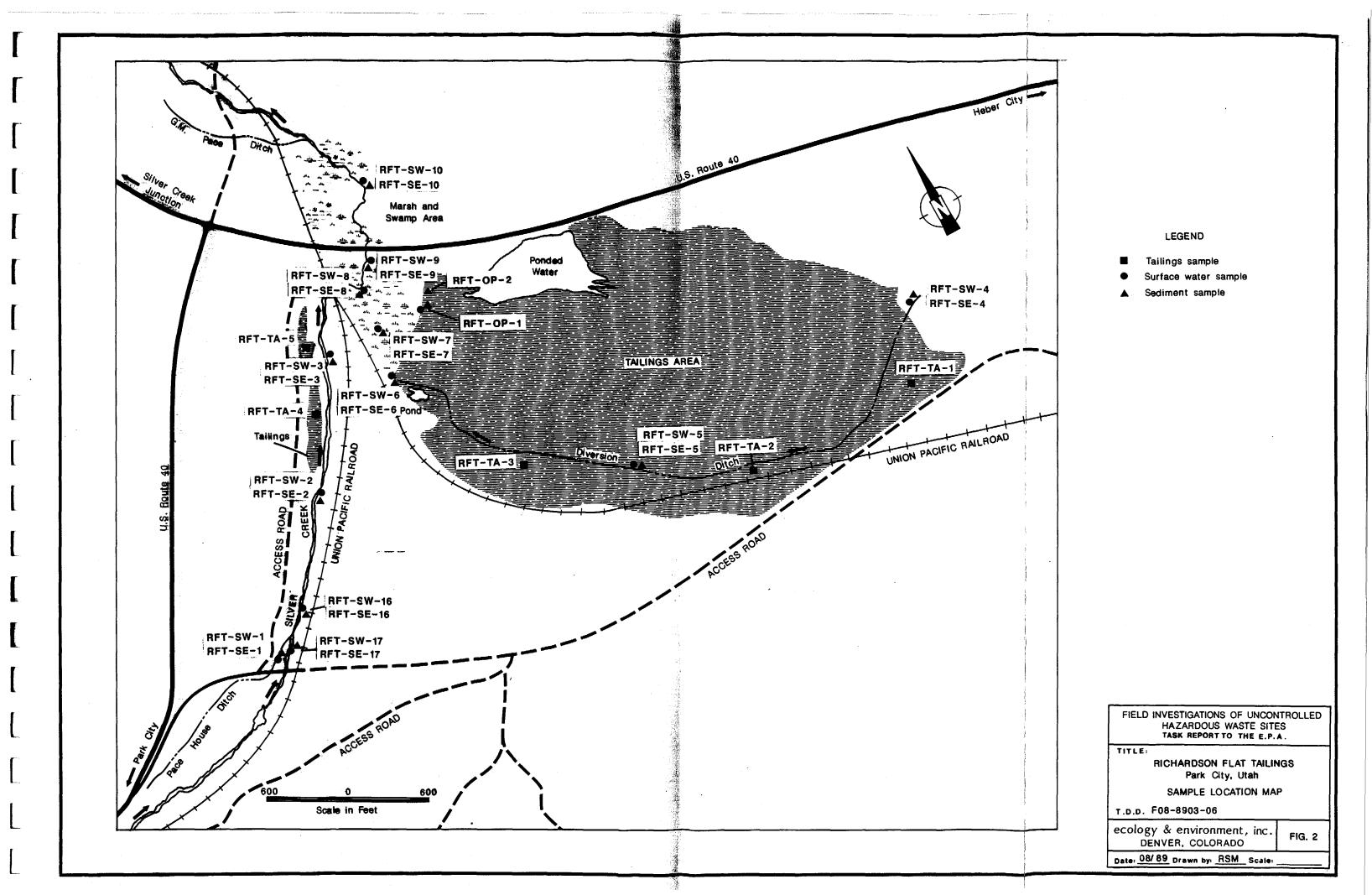
10.0 REFERENCES

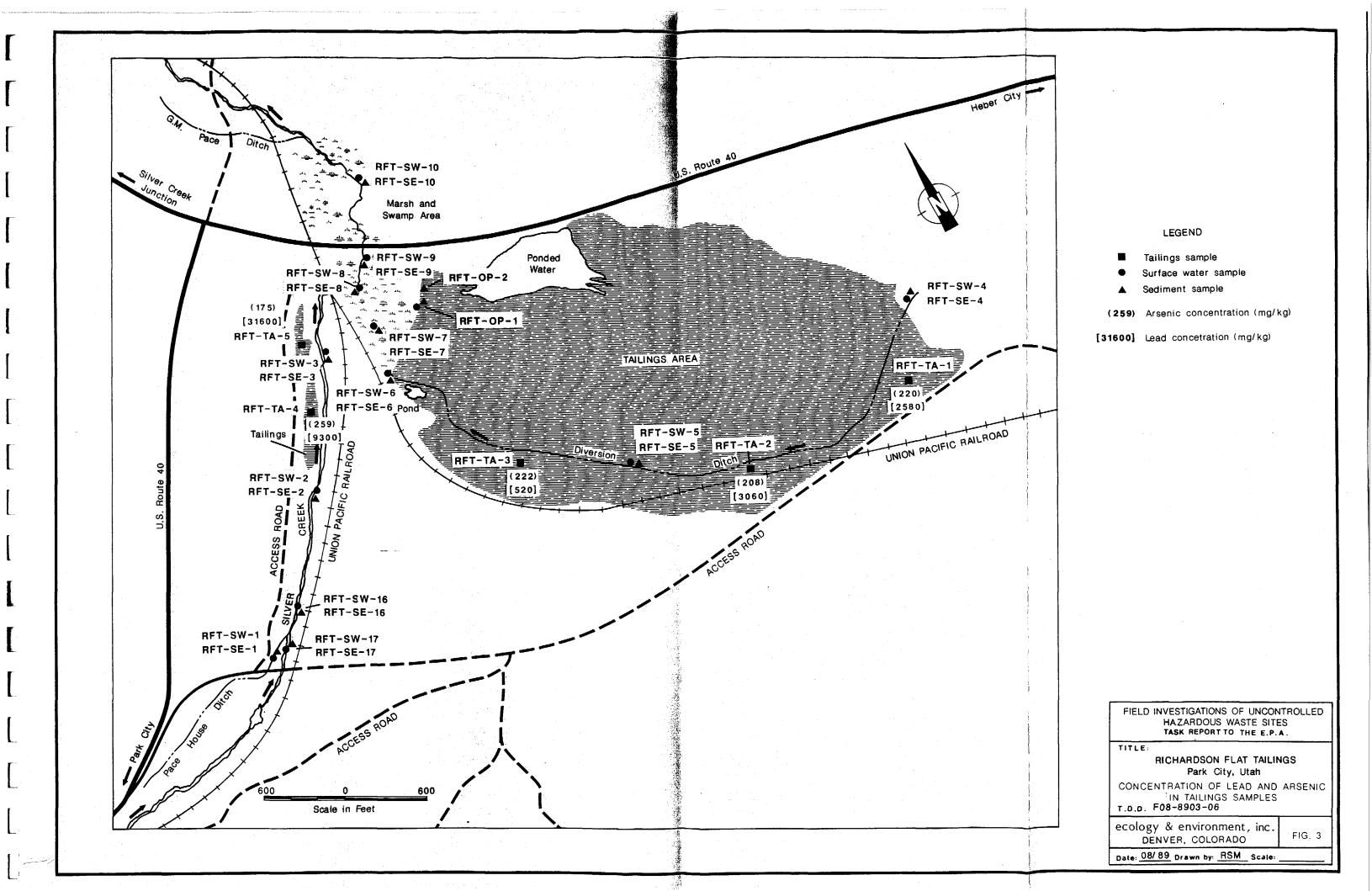
- Baker, C. H., Jr., 1970, Water Resources of the Heber-Kamas-Park City
 Area North Central Utah, Utah Dept. of Nat. Res. Tech. Publ. No. 27.
- Ecology and Environment, Inc., 9/30/85, Sampling Activities Report for Richardson Flat Tailings, TDD R8-8505-27.
- Ecology and Environment, Inc., 10/25/85, Analytical Results Report for Richardson Flat Tailings, TDD R8-8508-07.
- Ecology and Environment, Inc., 9/11/86, Air Sampling Activities Report for Richardson Flat Tailings, TDD R8-8605-12.
- Ecology and Environment, Inc., 9/9/8, Air Analytical Results Report for Richardson Flat Tailings, TDD R8-8608-05.
- Ecology and Environment, Inc., April, 1989, Standard Operating

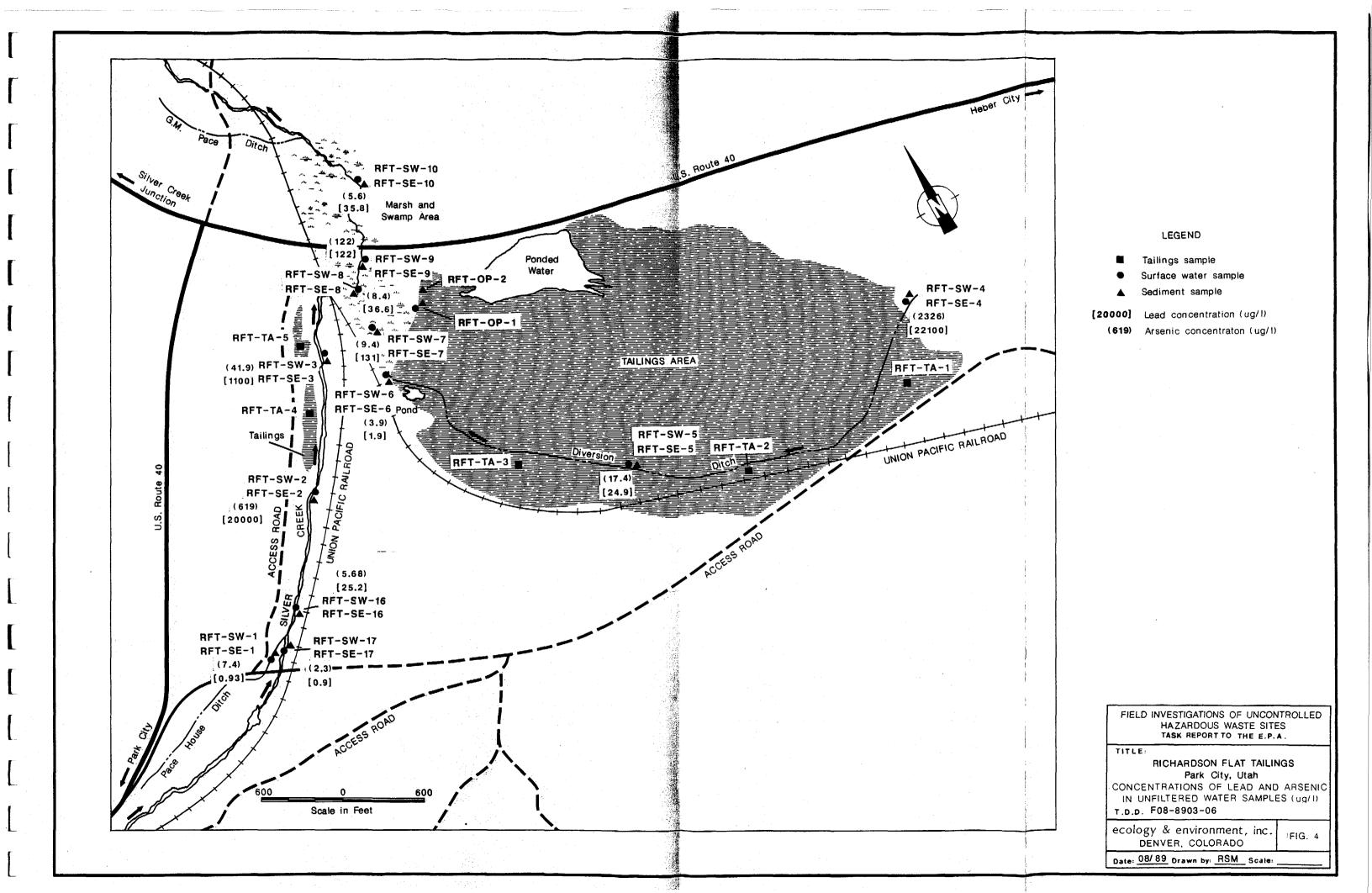
 Procedures for Field Operations at Hazardous Waste Sites SOP

 III-2.
- Ecology and Environment, Inc., 1989, Standard Operating Procedures for FASP XRF Method--Screening for Metals in Soil/Solid Samples SOP VI-2.
- USEPA Contract Laboratory Program, July, 1987, Statement of Work, No. 787 for Inorganics Analysis; Multimedia, Multiconcentration.
- USEPA Hazardous Site Control Division, 1985, USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis. TDD H0-8410-01.
- U.S. Weather Bureau, 1963, Normal Annual and May-September Precipitation (1931-60) for the State of Utah: Map of Utah, Scale 1:50,000.









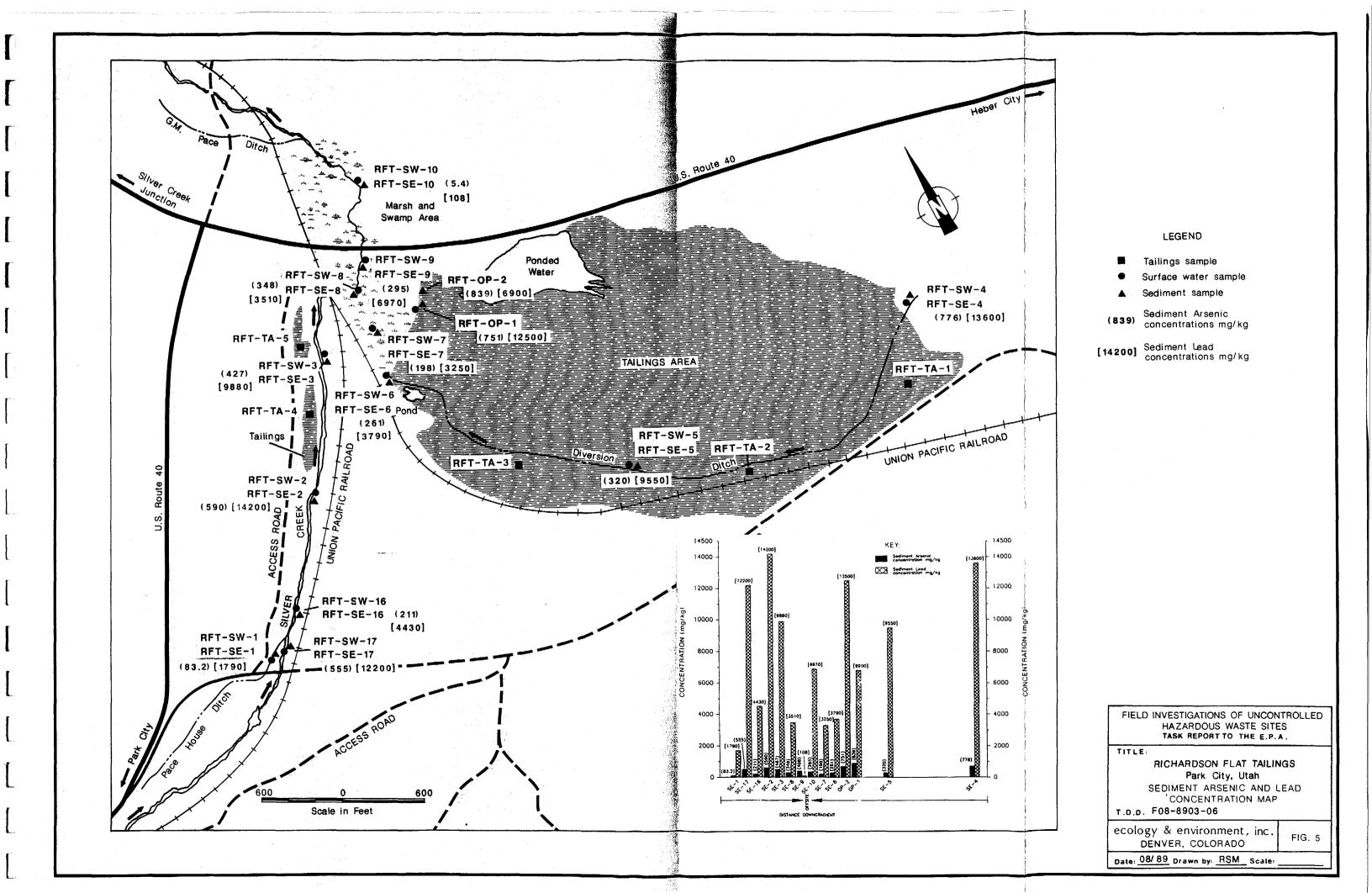


TABLE 1 SURFACE WATER FIELD DATA SITE: Richardson Flat Tailings									
SAMPLE ID. SAMPLING		SHIPPING DATE	FIELD DATA			COMMENTS			
	DATE	TIME	DATE	pH	COND.	TEMP.			
RFT-SW-1A & B	07/19/89	1107	07/20/89	7 . 5	620	20			
RFT-SW-2A & B	07/19/89	1040	07/20/89	7.3	1300	19	These samples were collected in Silver Creek down- stream of construction activities. These activities resulted in highly turbid water which, in turn, may increase metals concentrations in unfiltered surface		
RFT-SW-3A & B	07/19/89	1016	07/20/89	7.5	1350	18	water samples RFT-SW-2B and RFT-SW-3B.		
RFT-SW-4A & B	07/19/89	0911	07/20/89	7.05	1000	14			
RFT-SW-5A & B	07/19/89	0854	07/20/89	7.09	1300	14			
RFT-SW-6A & B	07/19/89	0824	07/20/89	6.8	1600	17	· ·		
RFT-SW-7A & B	07/18/89	1648	07/20/89	6.01	1500	20			
RFT-SW-8A & B	07/18/89	1633	07/20/89	6.61	1500	19			
RFT-SW-9A & B	07/18/89	1345	07/20/89	7.74	1200	24			
RFT-SW-10A & B	07/18/89	1511	07/20/89	8.08	1200	22			
RFT-OPW-1A & B	07/19/89	1345	07/20/89	7,51	1200	17			

TABLE 1 (Cont) SURFACE WATER FIELD DATA SITE: Richardson Flat Tailings

	TAB	LE 1 (Cont) SUR	FACE WATER FI	SITE:	Richardson Flat Tailings		
SAMPLE ID.	SAMPLE ID. SAMPLING SHIPPING DATE		FIELD DATA			COMMENTS	
	DATE	TIME	DATE	рН	COND.	TEMP. C	
RFT-SW-11A & B	07/19/89	1040	07/20/89	7.3	1300	19	Duplicate of RFT-SW-2A & B
RFT-SW-15A & B	07/19/89	1437	07/20/89				Blank
RFT-SW-16A,& B	07/20/89	1025	07/20/89	7.15	1000	16	
7 RFT-SW-17A & B	07/20/89	1040	07/20/89	7.0	1000	16	
RFT-SW-18A & B	07/20/89	1100	07/20/89				Blank
		·					
			·			,	

TABLE 2 SOIL AND SEDIMENT FIELD DATA SITE Richardson Flat Tailings

SAMPLING		SHIPPING DATE	COMMENTS		
DATE TIME					
07/19/89	1107	07/20/89	Dark brown material, some organic matter present		
07/19/89	1040	07/20/89	Light gray medium to fine grained sediment		
07/19/89	1016	07/20/89	Light gray medium to fine grained sediment		
07/19/89	0925	07/20/89	Dark brown to medium gray, fine grained sediment		
07/19/89	0900	07/20/89	Gray with rust color		
07/19/89	0835 .	07/20/89	Light gray, medium to coarse grained sediment		
07/18/89	1700	07/20/89	Dark brown sediment high in organic matter		
07/18/89	1640	07/20/89	Dark brown sediment high in organic matter		
07/18/89	1351	07/20/89	Medium gray fine grained sediment, some organic matter present		
07/18/89	1524	07/20/89	Dark brown silty clay (fine grained)		
07/20/89	1025	07/20/89	Medium gray, fine to coarse grained sediment		
07/20/89	1040	07/20/89	Medium gray, fine to coarse grained sediments		
07/18/89	1115	07/20/89	Tan or rust colored, fine sand or tailings		
07/18/89	1125	07/20/89	Tan colored, fine sand or tailings		
	07/19/89 07/19/89 07/19/89 07/19/89 07/19/89 07/19/89 07/18/89 07/18/89 07/18/89 07/20/89 07/20/89 07/18/89	DATE TIME 07/19/89 1107 07/19/89 1040 07/19/89 1016 07/19/89 0925 07/19/89 0900 07/19/89 0835 07/18/89 1700 07/18/89 1640 07/18/89 1524 07/20/89 1025 07/18/89 1115	DATE TIME 07/19/89 1107 07/20/89 07/19/89 1040 07/20/89 07/19/89 1016 07/20/89 07/19/89 0925 07/20/89 07/19/89 0900 07/20/89 07/19/89 0835 07/20/89 07/18/89 1700 07/20/89 07/18/89 1640 07/20/89 07/18/89 1524 07/20/89 07/20/89 1025 07/20/89 07/20/89 1040 07/20/89 07/18/89 1115 07/20/89		

TABLE 2 SOIL AND SEDIMENT FIELD DATA SITE Richardson Flat Tailings

SAMPLE ID	SAMPLING		SHIPPING DATE	COMMENTS			
: .	PATE	TIME					
RFT-TA-3	07/18/89	1138	07/20/89	Light tan to gray material, fine texture			
RFT-TA-4	07/18/89	1205	07/20/89	Soil pH measurements showed a pH of 2 for these tailings			
RFT-TA-5	07/18/89	1217	07/20/89	Soil pH measurements showed a pH of 2			
!							
•							
,							
		1		The state of the s			

TABLE 3 INORGANIC ANALYTICAL RESULTS FOR TAILINGS SAMPLES (mg/kg) RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD FO8-8903-06 - PAN FUT0039HDA

SAMPLE # TRAFFIC RPT # SAMPLE LOCATION	RFT-TA-1 MHL-955 EAST OF TAILINGS POND	RFT-TA-2 MHL-956 MIDDLE OF TAILINGS POND	RFT-TA-3 MHP-500 WEST OF TAILINGS POND	RFT-TA-4 MHP-501 FLOOD PLAIN TAILINGS	RFT-TA-5 MHP-502 FLOOD PLAIN TAILINGS
Aluminum	691	1040	1530	1030	240
Antimony	63.1	84.4	87.0	120	144
Arsenic	220j	208j	222j	259j	175j
Barium	153	86.9	[32.8]	117	[39.5]
Beryllium	0.22u	0.22u	0.22u	0.27u	0.23u
Cadmium	21.1	41.2	95.9	117	250
Calcium	37000	54500	68200	5400	32800
Chromium	[2.0]	6.0	8.8	0.69u	0.59u
Cobalt	[5.5]	[2.6]	[7.4]	[3.9]	[3.2]
Copper	149	205	336	281	265
Iron	44700	3 65 00	53400	97400	87000
Lead	2580	3060	4520	9300	31600
Magnesium	11200	18500	23000	[1140]	[142]
Manganese	1440	1740	2320	212	252
Mercury *	0.99	1.3	.88	8.20	7.60
Nickel	8.2	9.4	[7.1]	[5.1]	[6.2]
Potassium	[255]	[496]	[827]	[1140]	[680]
Selenium	23.6	12.7	19.2	45.7	38.4
Silver	12.6	18.5	22.1	62.8	115
Sodium	[22.4]	[34.8]	[42.6]	[603]	[117]
Thallium	6.6j	3.0j	[4.2]j	[9.7]j	[6.8]j
Vanadium	[1.3]	[3.8]	[3.7]	[2.6]	0.57u
Zinc	3220	5710	14100	16200	33800

- * Results have been provided by Keystone Laboratory of Houston, Texas. The remaining results are from analyses conducted by Silver Valley Laboratories of Kellog, Idaho.
- j The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL) or because minor quality control criteria were not met. Presence of the material is reliable.
- u The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.
- [] The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL). Presence of the material is reliable. (Inorganic data only).

TABLE 4 INORGANIC ANALYTICAL RESULTS FOR SEDIMENT SAMPLES RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD F08-8903-06 - PAN FUT0039HDA

SAMPLE # PACKING LIST # SAMPLE LOCATION	RFT-SE-1 4725H-01 BCKGRND IRRIG DITCH	RFT-SE-2 4725H-O2 SILVER CRK NEXT TO FLOOD PLAIN	RFT-SE-3 4725H-O3 SILVER CRK DNGRDNT FLOOD PLAIN	RFT-SE-4 4725H-04 UPGRDNT DIVERSION DITCH	RFT-SE-5 4725H-05 DIVERSION DITCH
Aluminum	18400	8620	7650	25100	2810
Antimony	19.8j	201j	114j	200j	178j
Arsenic	83.2	590	427	776	320
Barium	270	147	130	1220	134
Beryllium	1.7	[.86]	[.81]	[1.9]	[.47]
Cadmium	14.6j	91.4j	82.0j	100j	149j
Calcium	15000	25600	2610	82100	89700
Chromium	21.9	.77u	[1.0]	33.2	10.9
Cobalt	[11.4]	43.5	38.5	[10.1]	[5.3]
Copper	239	753	459	840	613
Iron	30800	181000	148000	58600	44800
Lead	1790	14200	9880	13600	9550
Magnesium	6130	9430	8480	33800	19700
Manganese	1260	1730	1630	2770	3090
Mercury	1.0	4.9	6.0	5.5	1.5
Nickel	23.5	21.5	28.8	27.0	[2.9]
Potassium	3160	[1160]	[1150]	6270	[794]
Selenium	3.1j	46.2j	42.7j	15.4j	16.1jr
Silver	9.7	47.5	30.3	86.0	60.9
Sodium	[239]	[181]	[173]	[447]	[84.6]
Thallium	[.81]j	[3.6]j	4.1j	23.2j	12.7j
Vanadium	48.7	19.0	21.2	46.5	[8.6]
Zinc	2770	15500	15100	15700	26400

j - The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL) or because minor quality control criteria were not met. Presence of the material is reliable.

r - Quality control indicates that data is \underline{not} usable (material may or may not be present). DO NOT USE THIS DATA!.

u - The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.

^{[] -} The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL). Presence of the material is reliable. (Inorganic data only).

TABLE 4 CONT. INORGANIC ANALYTICAL RESULTS FOR SEDIMENT SAMPLES (mg/kg) RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD FO8-8903-06 - PAN FUT0039HDA

SAMPLE # PACKING LIST # SAMPLE LOCATION	RFT-SE-6 4725H-06 OUT FLOW POINT FOR DIVERSION DITCH	RFT-SE-7 4725H-07 MARSH	RFT-SE-8 4725H-08 SILVER CRK DRAINAGE IN MARSH AREA	RFT-SE-9 4725H-09 CULVERT DRAINAGE MARSH AREA	RFT-SE-10 4725H-10 DNGRDNT 800' UPSTRM OF IRRIG DITCH
Aluminum	11100	9710	14000	10900	20200
Antimony	40.8	37.6j	80.5j	107j	10.1uj
Arsenic	261j	198	348	295	5.4
Barium	944	384	286	229	408
Beryllium	[.85]	[1.1]	[1.5]	[1.4]	1.6
Cadmium	62.3j	102j	82.3j	90.2j	2.2j
Calcium	46900	90700	85800	38700	9640
Chromium	.71u	9.9	16.5	16.3	18.5
Cobalt	64.4	20.4	33.3	20.1	[10.9]
Copper	256	264	567	498	40.7
Iron	41400	64900	49200	68700	25500
Lead	3790	3250	3510	6970	108
Magnesium	13300	20700	18400	11100	6360
Manganese	207000	19100	14300	3070	303
Mercury	0.24	0.82	1.1	5.0	[.10]
Nickel	69.7	14.0	25.8	16.3	17.0
Potassium	1870	1880	2400	1590	6050
Selenium	5.6j	9.2j	13.2j	21.9j	5.6ur
Silver	13.7	23.9	36.9	36.2	.41u
Sodium	[344]	[254]	[276]	[220]	[389]
Thallium	8.5j	10.1j	14.2j	4.1j	.23uj
Vanadium	34.8	20.5	26.9	31.2	37.7
Zinc	18800	17600	18300	15900	302

- j The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL) or because minor quality control criteria were not met. Presence of the material is reliable.
- r Quality control indicates that data is <u>not</u> usable (material may or may not be present). **DO NOT USE THIS DATA!**.
- u The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.
- [] The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL). Presence of the material is reliable. (Inorganic data only).

TABLE 4 CONT. ANALYTICAL RESULTS FOR INORGANIC SEDIMENT SAMPLES RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD FO8-8903-06 - PAN FUT0039HDA

SAMPLE # PACKING LIST # SAMPLE LOCATION	RFT-OSE-1 4725H-11 OPPORTUNITY POND SEDIMENT SAMPLE	RFT-OSE-2 4725H-12 OPPORTUNITY SEEP SEDIMENT SAMPLE	RFT-SE-16 4725H-13 BCKGRND SEDIMENT ON SILVER CREEK	RFT-SE-17 4725H-14 BCKGRND BETWEEN IRRIG DITCH & ROAD ON SILVER
Aluminum	19500	6880	15200	4440
Antimony	142j	49.3j	53.9j	183j
Arsenic	751	839	211	555
Barium	668	557	209	66.0
Beryllium	[2.3]	[1.6]	[1.4]	[.63]
Cadmium	185j	131j	43.9j	113j
Calcium	249000	167000	14500	18900
Chromium	18.2	1.0u	11.8	.72u
Cobalt	[5.9]	53.3	24.6	76.8
Copper	870	456	231	496
Iron	156000	132000	86100	263000
Lead	12500	6900	4430	12200
Magnesium	29700	23400	6340	5880
Manganese	19600	23700	1560	1370
Mercury	1.9	.73	3.3	.81
Nickel	32.1	26.3	22.4	31.4
Potassium	4790	1690	2490	[657]
Selenium	19.9j	2.5j	25.1j	84.0j
Silver	60.6	22.5	15.5	39.8
Sodium	[764]	[206]	[215]	[105]
Thallium	24.1j	21.0j	1.2bj	6.0j
Vanadium	38.0	[18.6]	40.5	[10.4]
Zinc	24000	20000	8580	17500

j - The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL) or because minor quality control criteria were not met. Presence of the material is reliable.

u - The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.

^{[] -} The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL). Presence of the material is reliable. (Inorganic data only).

TABLE 5 ANALYTICAL RESULTS FOR INORGANIC SURFACE WATER SAMPLES (µg/1) RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD F08-8903-06 - PAN FUT0039HDA

SAMPLE # TRAFFIC RPT # SAMPLE LOCATION	RFT-SW-1A MHP-525 BCKGRND PACE HOMER DITCH	RFT-SW-1B MHP-526 BCKGRND PACE HOMER DITCH	RFT-SW-2A MHP-523 SILVER CRK NEAR FLOOD PLAIN TLGS	RFT-SW-2B MHP-524 SILVER CRK NEAR FLOOD PLAIN TLGS	RFT-SW-3A MHP-521 SILVER CRK NEAR FLOOD PLAIN TLGS
Aluminum	[27.9]ub	[26.3]ub	[18.2]ub	44500b	[16.5]ub
Antimony	19.9u	19.9u	[25.7]ub	210b	19.9u
Arsenic	[7.2]	[7.7]	[6.6]	619	[3.8]
Barium	[61.9]ub	[61.9]ub	[61.5]ub	881b	[52.9]ub
Beryllium	1.1u	1.1u	1.1u	[2.4]	1.1u
Cadmium	1.8u	1.8u	[5.0]ub	137b	9.2b
Calcium	132000ь	131000b	211000ь	248000Ъ	199000ь
Chromium	2.8u	2.8u	2.8u	72.2	2.8u
Cobalt	[3.1]ub	2.6u	[3.5]ub	[27.0]ub	[2.6]ub
Copper	1.1u	[2.4]ub	[1.2]ub	1390b	[1.5]ub
Iron	[56.4]ub	[84.7]ub	[63.2]ub	98500ъ	[39.9]ub
Lead	9.2bj	[0.93]ub	48.3bj	20000Ъј	38.2bj
Magnesium	34700Ъ	34400ь	41400b	68400Ъ	39600Ъ
Manganese	20.3ь	19.1b	1170b	3080Ъ	1080Ь
Mercury	0.20u	0.20u	0.20u	11.50	0.20u
Nickel	9.7u	9.7u	[13.9]	67.3	9.7u
Potassium	[1820]ub	[2110]ub	[3180]	8980Ъ	[3470]ub
Selenium	[15.4]ub	[15.2]ub	[2.6]ub	[34.2]ub	[14.7]ub
Silver	1.6u	1.6u	1.6u	131b	1.6u
Sodium	19700	19700	42300Ъ	42900Ь	41000b
Thallium	0.90u	0.90u	0.90u	[4.7]	0.90u
Vanadium	2.7u	2.7u	2.7u	129	2.7u
Zinc	64.1b	52.7b	1730b	19300Ь	2360Ь

- b Material was detected in the laboratory blanks. Quantity reported is >5X the amount found in the blank (>10X for methylene chloride, acetone, toluene, and phthalates). A false positive result may exist.
- u The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.
- [] The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL). Presence of the material is reliable. (Inorganic data only).

TABLE 5 CONT. INORGANIC ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD F08-8903-06 - PAN FUT0039HDA

-	SAMPLE # TRAFFIC RPT # SAMPLE LOCATION	RFT-SW-3B MHP-522 SILVER CRK NEAR FLOOD PLAIN TLGS	RFT-SW-4A MHP-515 UPGRDNT DIVERSION DITCH	RFT-SW-4B MHP-516 UPGRDNT DIVERSION DITCH	RFT-SW-5A MHP-517 DIVERSION DITCH	RFT-SV-5B MHP-518 DIVERSION DITCH
	Aluminum	1740b	[32.8]	30900	[32.6]	[33.7]
	Antimony	[53.8]ub	[39.3]	937	19.9u	19.9u
	Arsenic	41.9	68.6	2326	10.7j	17.4j
	Barium	[82.2]ub	[102]	2330	[37.0]	[35.9]
	Beryllium	1.1u	1.1u	[1.7]	1.1u	1.1u
	Cadmium	[16.0]	[4.6]	289	[3.3]	6.2
	Calcium	206000Ъ	180000	446000	308000	314000
	Chromium	2.8u	2.8u	50.2	2.8u	2.8u
	Cobalt	[5.7]	[8.8]	[48.7]	2.6u	2.6u
	Copper	71.4b	[13.6]	1540	[12.4]	[5.6]
	Iron	5320ь	267	107000	416	696
	Lead	1100ьј	41.8	22100j	12.9	24.9
	Magnesium	42000Ъ	38000	104000	61600	62700
	Manganese	1220b	2780	21100	1310	1340
	Mercury	0.2 u	0.2u	8.0	0.2u	0.2u
	Nickel	9.7u	9.7u	65.5	[25.8]	9.7u
	Potassium	[3160]ub	5580	15600	273u	273u
	Selenium	[28.5]ub	14.0ur	1.2ur	14.0ur	14.0ur
	Silver	[6.3]ub	1.6u	201	1.6u	1.6u
	Sodium	42000ь	54600	58500	28800	29300
	Thallium	0.90u	14.1	83.4j	1.0u	1.0u
	Vanadium	[5.5]	2.7u	58.7	2.7u	2.7u
	Zinc	3790Ъ	2650	49100	2990	3060

- b Material was detected in the laboratory blanks. Quantity reported is >5X the amount found in the blank (>10X for methylene chloride, acetone, toluene, and phthalates). A false positive result may exist.
- j The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL) or because minor quality control criteria were not met. Presence of the material is reliable.
- r Quality control indicates that data is \underline{not} usable (material may or may not be present). **DO NOT USE THIS DATA!.**
- u The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.
 [] The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL). Presence of the material is reliable. (Inorganic data only).

TABLE 5 CONT. INORGANIC ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD F08-8903-06 - PAN FUT0039HDA

SAMPLE # TRAFFIC RPT # SAMPLE LOCATION	RFT-SW-6A MHP-519 DIVERSION DITCH OUTFALL	RFT-SW-6B MHP-520 DIVERSION DITCH OUTFALL	RFT-SW-7A MHP-509 MARSHY AREA	RFT-SW-7B MHP-510 MARSHY AREA	RFT-SW-8A MHP-511 SILVER CRK IN MARSHY AREA
Aluminum	[17.6]	[34.7]ub	11.5u	368	[16.8]
Antimony	19.9u	19.9u	19.9u	19.9u	19.9u
Arsenic	2.3u	[3.9]	2.3u	[9.4]	[5.3]
Barium	[14.9]	[14.9]ub	[14.9]ub	[37.0]	[32.1]
Beryllium	1.1u	1.1u	1.1u	1.1u	1.1u
Cadmium	1.8u	1.8u	1.8u	[2.6]	1.8u
Calcium	316000	330000Ъ	322000	333000	320000
Chromium	2.8u	2.8u	2.8u	2.8u	2.8u
Cobalt	2.6u	[3.8]ub	2.6u	[3.8]	2.6u
Copper	[10.4]	[1.2]ub	[1.9]	[12.9]	1.1u
Iron	426	123	270	1070	224
Lead	1.8u	[1.9]ubj	0.90u	131	0.90u
Magnesium	68200	71200b	68700	70500	68600
Manganese	3180	3170Ь	94.8	2110	960
Mercury	0.2u	0.2u	0.2u	0.2u	0.2u
Nickel	[13.2]	9.7u	9.7u	9.7u	9.7u
Potassium	[2010]	[2230]	[1480]	[1710]	[1330]
Selenium	14.0ur	12.0u	14.0ur	1.4ur	14.0ur
Sodium	45000	49600Ե	47500	48400	46700
Silver	1.6u	1.6u	1.6u	[2.4]	1.6u
Thallium	1.0u	0.9u	1.0u	1.0u	1.0u
Vanadium	2.7u	2.7u	2.7u	2.7u	2.7u
Zinc	219	198ь	190	656	295

j - The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL) or because minor quality control criteria were not met. Presence of the material is reliable.

 $u\,$ - The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.

^{[] -} The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL). Presence of the material is reliable. (Inorganic data only).

TABLE 5 CONT. INORGANIC ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD F08-8903-06 - PAN FUT0039HDA

SAMPLE # TRAFFIC RPT # SAMPLE LOCATION	RFT-SW-8B MHP-512 SILVER CRK IN MARSHY AREA	RFT-SW-9A MHP-506 CULVERT NEAR ROUTE 40	RFT-SW-9B MHP-507 CULVERT NEAR ROUTE 40	RFT-SW-10A MHP-503 DNGRDNT SAMPLE	RFT-SW-10B MHP-504 DNGRDNT SAMPLE
Aluminum	[106]	[24.6]	370	[26.6]	[75.8]
Antimony	19.9u	19.9u	19.9u	19.9u	19.9u
Arsenic	[8.4]	[6.8]	12.2	[3.3]	[5.6]r
Barium	[33.5]	[54.6]	[59.1]	[51.5]	[52.5]
Beryllium	1.1u	1.1u	1.1u	1.1u	1.1u
Cadmium	1.8u	1.8u	1.8u	[2.0]	[2.2]
Calcium	303000	139000	144000	147000	147000
Chromium	2.8u	2.8u	[2.8]	2.8u	2.8u
Cobalt	2.6u	[2.6]	2.6u	2.6u	[4.0]
Copper	[4.9]	[2.9]	[11.7]	[6.3]	[5.6]
Iron	1090	338	1200	195	481
Lead	36.6	6.2	122	[5.9]	35.8
Magnesium	64900	34600	35600	36400	36200
Manganese	950	274	335	223	240
Mercury	0.2u	0.2u	0.2u	0.2u	0.2u
Nickel	9.7u	9.7u	9.7u	9.7u	9.7u
Potassium	[986]	[1790]	[1980]	2090	[1920]
Selenium	14.0ur	14.0ur	1.4ur	1.4ur	14.0ur
Silver	1.6u	1.6u	1.6u	1.6u	1.6u
Sodium	44300	22900	23400	25200	24100
Thallium	1.0u	1.0u	1.0u	1.0u	1.0u
Vanadium	2.7u	2.7u	2.7u	2.7u	2.7u
Zinc	332	429	726	419	519

j - The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL) or because minor quality control criteria were not met. Presence of the material is reliable.

u - The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.

^{[] -} The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL). Presence of the material is reliable. (Inorganic data only).

TABLE 5 CONT. INORGANIC ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD FO8-8903-06 - PAN FUTOO39HDA

SAMPLE # TRAFFICE RPT # SAMPLE LOCATION	MHP528	RFT-SW-11B MHP-527 DUPLICATE OF 2B	RFT-SW-12A MHP-513 FILIERED BLANK	RFT-SW-12B MHP-514 UNFILTERED BLANK	RFT-SW-15A MHP-529 FILTERED BLANK	RFT-SW-15B MHP-53O UNFILTERED BLANK	MHP-534
Aluminum	[28.0]ub	43400b	[23.3]	[16.6]	[24.9]ub	[32.1]ub	[44.6]ub
Antimony	[26.9]ub	199b	19.9u	19.9u	19.9u	19.9u	[20.1]ub
Arsenic	[5.6]	540	2.3u	12.0	2.3u	2.3u	2.3u
Barium	[60.8]	788b	1.3u	1.3u	1.3u	1.3u	[56.7]ub
Beryllium	1.1u	[2.1]	1.1u	1.1u	1.1u	1.1u	1.1u
Cadmium	6.0b	127b	1.8u	1.8u	1.8u	1.8u	10.3b
Calcium	211000Ъ	246000b	[154]	[56.3]	[214]ub	[136]ub	205000ь
Chromium	2.8u	68.5	[3.5]	2.8u	2.8u	2.8u	2.8u
Cobalt	[5.3]	[28.4]ub	2.6u	2.6u	2.6u	2.6u	[3.1]ub
Copper	[1.2]	1260b	1.1u	[4.4]	1.1u	1.1u	[2.7]ub
Iron	[55.1]	89300b	277	219	[64.2]ub	[41.5]ub	[31.5]ub
Lead	34.6bj	17900bj	0.90u	0.90u	[1.8]ubj	[1.6]ubj	[1.4]ubj
Magnesium	41400b	67100b	[42.5]	20.9u	[43.7]ub	[29.0]ub	40400ь
Manganese	1180b	2950ъ	[2.3]	[2.0]	[1.4]ub	[2.5]ub	1070b
Mercury	0.20u	8.50	0.2u	0.2u	.20u	.20u	.20u
Nickel	9.7u	57.3	9.7u	9.7u	9.7u	9.7u	9.7u
Potassium	[3060]ub	8770ь	273u	273u	273u	273u	[3180]ub
Selenium	[15.1]ub	[43.9]ub	1.4ur	1.4ur	1.2u	1.2u	[2.7] ub
Silver	1.6u	117	1.6u	1.6u	1.6u	23.8b	1.6u
Sodium	41200	42700	[68.9]	[76.0]	[47.5]ub	13.2u	41900b
Thallium	0.90u	[4.2]	1.0u	1.0u	.90u	.90u	.90u
Vanadium	[3.8]	121	2.7u	2.7u	2.7u	2.7u	2.7u
Zinc	1730b	17700b	[4.5]	1.3u	[12.6]ub	[6.5]ub	2970ъ

b - Material was detected in the laboratory blanks. Quantity reported is >5X the amount found in the blank (>10X for methylene chloride, acetone, toluene, and phthalates). A false positive result may exist.

j - The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL) or because minor quality control criteria were not met. Presence of the material is reliable.

r - Quality control indicates that data is <u>not</u> usable (material may or may not be present). **DO NOT USE THIS DATA!.**

 $u\,$ - The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.

TABLE 5 CONT. INORGANIC ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD F08-8903-06 - PAN FUT0039HDA

SAMPLE # TRAFFIC RPT # SAMPLE LOCATION	RFT-SW-16B MHP-535 DNSTRM OF PACE HOMER DITCH CONFLUENCE W/SILVER CRK	RFT-SW-17A MHP-537 UPGRDNT CONFLUENCE SILVER CRK PACE HOMER DITCH	RFT-SW-17B MHP-538 UPGRDNT CONFLUENCE SILVER CRK PACE HOMER DITCH	RFT-SW-18A MHP-539 BLANK	RFT-SW-18B MHP-540 BLANK
Aluminum	[61.1]ub	[49.5]ub	[29.6]ub	[29.0]ub	[27.0]ub
Antimony	19.9u	19.9u	[20.1]ub	19.9u	19.9u
Arsenic	[5.6]	2.3u	2.3u	2.3u	2.3u
Barium	[56.0]ub	[54.3]ub	[51.1]ub	[1.7]ub	1.3u
Beryllium	1.1u	1.1u	1.1u	1.1u	1.1u
Cadmium	10.3b	13.3b	13.5b	1.8u	1.8u
Calcium	205000Ь	228000Ь	218000ь	[109]ub	[90.8]ub
Chromium	2.8u	2.8u	2.8u	2.8u	2.8u
Cobalt	[3.5]ub	[6.6]ub	[5.3]ub	2.6u	[2.7]ub
Copper	[4.9]ub	[3.9]ub	[1.5]ub	1.1u	1.1u
Iron	496b	346bj	[43.7]ub	[33.4]ub	[32.2]ub
Lead	25.2bj	8.8b	0.90uj	[1.3]ub	0.90uj
Magnesium	40300ь	41800b	39900ь	[38.6]ub	[27.8]ub
Manganese	1080b	1380b	1330ь	[2.0] և Ե	[1.4]ub
Mercury	0.20u	0.20u	0.20u	0.20u	0.20u
Nickel	[10.6]	9.7u	9.7u	9.7u	9.7u
Potassium	[3380]ub	[3630]ub	[3570]ub	273u	[437]ub
Selenium	1.2u	[20.0]ub	[18.0]ub	1.2u	1.2u
Silver	1.6u	1.6u	1.6u	1.6u	1.6u
Sodium	41900	48000b	46400b	[41.8]ub	[13.3]ub
Thallium	0.90u	0.90u	0.90u	0.90u	0.90u
Vanadium	2.7u	2.7u	2.7u	2.7u	2.7u
Zinc	3130b	3880ь	3720b	[2.9]ub	1.3u

- b Material was detected in the laboratory blanks. Quantity reported is >5X the amount found in the blank (>10X for methylene chloride, acetone, toluene, and phthalates). A false positive result may exist.
- j The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL) or because minor quality control criteria were not met. Presence of the material is reliable.
- u The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.
- [] The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL). Presence of the material is reliable. (Inorganic data only).

TABLE 5 CONT. INORGANIC ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD FO8-8903-06 - PAN FUT0039HDA

SAMPLE # TRAFFIC RPT # SAMPLE LOCATION	RFT-OPW-1A MHP-532 PONDED AREA AT BASE OF TLGS DAM	RFT-OPW-1B MHP-533 PONDED AREA AT BASE OF TLGS DAM
Aluminum	[23.0]ub	317b
Antimony	19.9u	19.9u
Arsenic	[2.9]	33.1
Barium	[37.3]ub	[82.2]ub
Beryllium	1.1u	1.1u
Cadmium	1.8u	[3.6]ub
Calcium	312000	369000Ъ
Chromium	2.8u	2.8u
Cobalt	[6.3]ub	[5.6]ub
Copper	[1.2]ub	[6.6]ub
Iron	503b	10200Ь
Lead	0.90u	68.2bj
Magnesium	56100b	58800b
Manganese	12900b	21400b
Mercury	0.20u	0.20u
Nickel	9.7u	9.7u
Potassium	5380	9960
Selenium	12.0u	[18.5]ub
Silver	1.6u	1.6u
Sodium	60000Ъ	63400b
Thallium	0.90u	0.90u
Vanadium	2.7u	2.7u
Zinc	[19.8]ub	759b

- b Material was detected in the laboratory blanks. Quantity reported is >5% the amount found in the blank (>10% for methylene chloride, acetone, toluene, and phthalates). A false positive result may exist.
- u The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit or CRDL.
- [] The associated numerical value is an estimated quantity because the amount detected is below the contract required detection limit (CRDL). Presence of the material is reliable. (Inorganic data only).

APPENDIX A SAMPLE COLLECTION AND SHIPMENT INFORMATION

APPENDIX A SAMPLE COLLECTION AND SHIPMENT INFORMATION RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD F08-8903-06 - PAN FUT0039HDA

SAMPLE ID	PARAMETERS	TRAFFIC RPT #	SAMPLE TAG #	CHAIN OF CUSTODY
RFT-SW-1A	METALS	MHP-525	8-94551	8-11438
RFT-SW-1B	METALS	MHP-526	8-94552	8-11438
RFT-SW-2A	METALS	MHP-523	8-94553	8-11438
RFT-SW-2B	METALS	MHP-524	8-94556	8-11438
RFT-SW-3A	METALS	MHP-521	8-94554	8-11438
RFT-SW-3B	METALS	MHP-522	8-94555	8-11438
RFT-SW-4A	METALS	MHP-515	8-94557	8-11438
RFT-SW-4B	METALS	MHP-516	8-94558	8-11438
RFT-SW-5A	METALS	MHP-517	8-94559	8-11438
RFT-SW-5B	METALS	MHP-518	8-94560	8-11438
RFT-SW-6A	METALS	MHP-519	8-94561	8-11438
RFT-SW-6B	METALS	MHP-520	8-94562	8-11438
RFT-SW-7A	METALS	MHP-509	8-94563	8-11446
RFT-SW-7B	METALS	MHP-510	8-94564	8-11446
RFT-SW-8A	METALS	MHP-511	8-94565	8-11446
RFT-SW-8B	METALS	MHP-512	8-94566	8-11446
RFT-SW-9A	METALS	MHP-506	8-94567	8-11446
RFT-SW-9B	METALS	MHP-507	8-94587	8-11446
RFT-SW-10A	METALS	MHP-503	8-94568	8-11446
RFT-SW-10B	METALS	MHP-504	8-94569	8-11446
RFT-SW-11A	METALS	MHP-528	8-94591	8-10998
RFT-SW-11B	METALS	MHP-527	8-94590	8-10998
RFT-SW-12A	METALS	MHP-513	8-94588	8-10998
RFT-SW-12B	METALS	MHP-514	8-94589	8-10998
RFT-SW-15A	METALS	MHP-529	8-94593	8-10998
RFT-SW-15B	METALS	MHP-530	8-94593	8-10998
RFT-SW-16A	METALS	MHP-534	8-94599	8-10997
RFT-SW-16B	METALS	MHP-535	8-94600	8-10997
RFT-SW-17A	METALS	MHP-537	8-94527	8-10997
RFT-SW-17B	METALS	MHP-538	8-94527	8-10997
RFT-SW-18A	METALS	MHP-539	8-94529	8-10997
RFT-SW-18B	METALS	MHP-540	8-94530	8–10997
RFT-TA-1	METALS	MHL-955	8-94580	8-11446
RFT-TA-2	METALS	MHL-956	8-94581	8-11446
RFT-TA-3	METALS	MHP-500	8-94582	8-11446
RFT-TA-4	METALS	MHP-501	8-94583	8-11446
RFT-TA-5	METALS	MHP-502	8-94584	8-11446

APPENDIX A CONT. SAMPLE COLLECTION AND SHIPMENT INFORMATION RICHARDSON FLAT TAILINGS SUMMIT COUNTY, UTAH TDD F08-8903-06 - PAN FUT0039HDA

SAMPLE ID	PARAMETERS	SAS #	SAMPLE TAG #	CHAIN OF CUSTODY
RFT-SE-1	METALS	4725H-01	8-94570	8-11437
RFT-SE-2	METALS	4725H-02	8-94571	8-11437
RFT-SE-3	METALS	4725H-03	8-94572	8-11437
RFT-SE-4	METALS	4725H-04	8-94573	8-11437
RFT-SE-5	METALS	4725H-05	8-94574	8-11437
RFT-SE-6	METALS	4725H-06	8-94575	8-11437
RFT-SE-7	METALS	4725H-07	8-94576	8-11437
RFT-SE-8	METALS	4725H-08	8-94577	8-11437
RFT-SE-9	METALS	4725H-09	8-94578	8-11437
RFT-SE-10	METALS	4725H-10	8-94579	8-11437
RFT-SE-16	METALS	4725H-13	8-94525	8-11440
RFT-SE-17	METALS	4725H-1	8-94528	8-11440

APPENDIX B SAMPLING PHOTO LOG



PHOTO 1: WEST FACING PHOTO OF SAMPLE LOCATION RFT-SW/SE-4.



PHOTO 2: WEST FACING PHOTO OF FIT MEMBER COLLECTING TAILINGS SAMPLE RFT-TA-1.



PHOTO 3 (LEFT): NORTHWEST FACING PHOTO OF FIT MEMBER COLLECTING TAILINGS SAMPLE RFT-TA-2.

PHOTO 4 (BELOW): SOUTH FACING PHOTO OF FIT MEMBER COLLECTING TAILINGS SAMPLE RFT-TA-3.



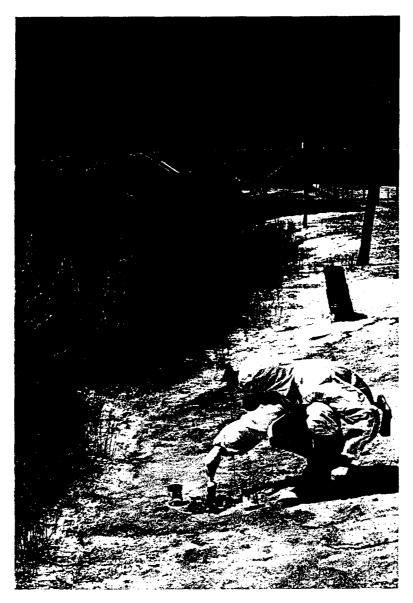


PHOTO 5: SOUTHWEST VIEW OF SAMPLE LOCATION RFT-TA-4.

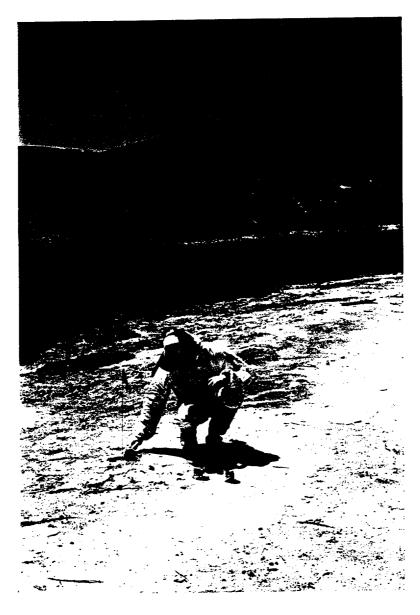


PHOTO 6: SOUTH VIEW OF SAMPLE LOCATION RFT-TA-5.



PHOTO 7: FIT MEMBER COLLECTING SAMPLE RFT-SW-9.



PHOTO 8: NORTHEAST FACING PHOTO OF FIT MEMBER COLLECTING SURFACE WATER SAMPLE RFT-SW/SE-7.



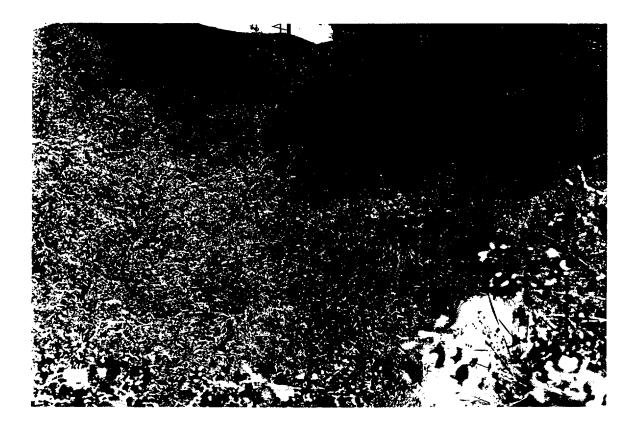
PHOTO 9: SOUTHEAST FACING PHOTO OF FIT MEMBER COLLECTING SAMPLE RFT-SW/SE-8.



PHOTO 10: NORTH FACING PHOTO OF SAMPLE LOCATION RFT-SW/SE-6.



PHOTO 11: WEST FACING PHOTO OF SAMPLE LOCATION RFT-SW/SE-5.



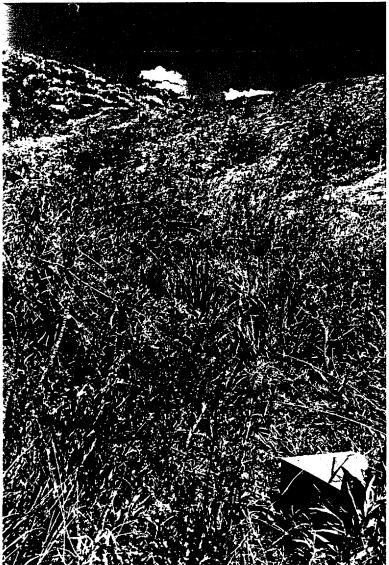


PHOTO 12 (ABOVE): SOUTH FACING
PHOTO OF SURFACE WATER
SAMPLE LOCATION RFT-OPW-1
AND RFT-OSE-1 AT BASE OF
TAILINGS DAM.

PHOTO 13 (LIFT): NORTHEAST
FACING PHOTO OF OPPORTUNITY SEDIMENT SAMPLE
LOCATION RFT-OSE-2.

APPENDIX C

QUALITY ASSURANCE REVIEW

REGION VIII SUMMARY OF DATA QUALITY ASSURANCE REVIEW

Case No.:	12334	TDD No.:	F0-8909-08

Site: Richardson Flats

Contractor Laboratory: Silver Valley Labs, Inc.; Kellogg, ID

Data Reviewer: Lynn Fischer Date of Review: Oct. 11, 1989

Sample Matrix: 19 low waters

Analysis: Metals and Mercury.

Sample Nos.: MHP520, MHP521, MHP522, MHP523, MHP524, MHP525, MHP526,

MHP527, MHP528, MHP529, MHP530, MHP532, MHP533, MHP534,

MHP535, MHP537, MHP538, MHP539, and MHP540.

- () Data are acceptable for use.
- (X) Data are acceptable for use with qualifications noted.
- () Data are preliminary pending verification.
- () Data are unacceptable.

Action required by DPO?

No X Yes The following items require action:

All Mercury data is unusable because of missed holding times. Mercury analysis however was performed by Keystone, TX prior to samples being shipped on to Silver Valley for analysis, this data is being used. SMO, or whomever decided to forward the samples should always consider holding time requirements when making these decisions.

Action required by project officer?

No X Yes

The following are our findings:

Data are acceptable for use, with the exception of the mercury analysis, with the following qualifications.

Holding time criteria were met for all analysis with the exception of the mercury cold vapor analysis; all the mercury results are flagged "a", unusable.

All calibration frequencies and requirements were met.

Quite a few contaminants were detected in analysis of the initial, continuing, and laboratory preparation blanks they are: aluminum, antimony, barium, calcium, cadmium, cobalt, copper, iron, magnesium, manganese, potassium, selenium, silver, sodium, zinc, and lead. All samples with positive results for these analytes were flagged "ub", "uj", or "b". "UB" was used to flag those results detected below the contract required detection limit (CRDL), "uj" was used to flag those results greater than the CRDL but less than five times the greatest amount detected in any blank, and "b" was used to flag all other positive results.

Brackets are applied to all results greater than the instrument detection limit (IDL) but less than the CRDL.

Duplicate results for the following analytes were outside limits (+/-20%), however none were flagged because all were associated with either results below the CRDL, contaminants detected in the blanks, or one of the values was undetected: aluminum, copper, iron, potassium, arsenic, and selenium.

Analysis of the spiked sample had two outliers, lead (16.7%) and selenium (-134.3%), limits are (75-125%). All lead results were flagged "j", results may be biased low. No flags were added to selenium results since both the sample and spiked sample results were less than the CRDL.

All other quality control (QC) criteria were met.

Inorganic Data Completeness Checklist

Inorganic analysis data (Form I) Initial calibration and continuing calibration verification (Form IIA) CRDL standard for AA and ICP (Form IIB) Blanks (Form III) ICP interference Check sample (Form IV) Spike sample recovery (Form VA) Post digestion spike sample recovery (Form VB) Duplicates (Form VI) Laboratory control sample (Form VII) Standard addition results (Form VIII) ICP serial dilutions (Form IX) Holding times (Form X) Instrument detection limits-quarterly (Form XI) ICP interelement correction factors-quarterly (Form II) ICP linear ranges-quarterly (Form XIII) Raw data for interference checks Raw data for calibration standards Raw data for blanks Raw data for CRI and/or CRA Raw data for samples Raw data for duplicates Raw data for spikes Traffic reports

Contract Compliance

ı.		tial and Continuing Calibration idelines pg. E-4, Form IIA)	Verificatio	n (ICV and CCV)
	1.	Was instrument calibrated dail	y and each t yes X	ime it was set up?
	2.	Were instruments calibrated us	ing 1 blank yes X	and several standards?
	3.	Were calibration verifications	within 90-1 yes X	10%? no
	4.	Were continuing calibrations r	un at 10% fr yes X	equency?
	5.	Were the raw data correctly tr	anscribed on yes X	to Form IIA?
II.		L Standards for ICP (CRI) and/om IIB)		
	1.	For ICP analysis, were standard (whichever was greater) analyzeach sample run, or at a minimus whichever was more frequent?	ed at the be	ginning and the end of
			yes X	no
	2.	For furnace AA analysis, were beginning and the end of each twice/8 hour shift, whichever	sample run,	or at a minimum of
	3.	Were the CRI and/or CRA standa	rds analyzed yes X	after the ICV?
	4.	Were these data reported on Fo	rm IIB? yes X	no
		Were the raw data correctly tra	yes X	to Form IIB?
111.	. В.	lanks (guidelines pg. E-6, Form	111)	
	1.	 Was the initial calibration is after the initial calibration 		
	2.	 Was a continuing calibration after each continuing calibration 		
	3.	• Was a preparation blank (PB) least 1 in 20 samples?	analyzed at	a frequency of at
			yes X	no NA

	4	How many elements were detected above the CRDLs? o (if 0, g to question 5)
		4a. How many elements were detected in the blanks at greater than one-half the amount detected in any sample?
	5	· Were raw data correctly transcribed onto Form III?
Com	men t	yes X nos: See narrative for elements detected in blanks.
IV.	IC	P Interference Checks (ICS) (guidelines pg. E-7, Form IV)
	1.	Was the ICS analyzed twice per 8 hour shift? yes X no
	2.	Were the ICSs analyzed before and after samples? yes X no
	3.	Was any massive interference detected? yes no X
	4.	Were the ICSs within ±20% mean value? yes X no
	5.	Were raw data correctly transcribed onto Form IV?
V.	Spi	ke Sample Analysis (S) (guideline pg. E-8, Form V)
	1.	Were spikes analyzed at a frequency of 1 in 20 samples? yes'X no
	2.	Were spike recoveries correctly calculated? yes X no
		$% recovery = \frac{(SSR - SR)}{SA} \times 100$
		SSR = Spiked Sample Result SR = Sample Result SA = Spike Added
	3.	Were spike recoveries within the range of 75-125%? yes no X
		<pre>3a. For recoveries outside this range, were associated data flagged "N" by the laboratory on Forms I and V?</pre>
		(an exception if granted where the sample concentration is >4X the spike concentration)
		4. Were raw data correctly transcribed onto Form V?

:

yes	X	no:

* Refer to page E-9 (SOW 787) for information regarding the amount of spike to be added for each analyte and for other information about the Spike Sample Analysis.

_VI. Duplicates (D) (guidelines pg. E-11, Form VI)

- 1. Were duplicates analyzed at a frequency of 1 in 20 samples?

 yes X no
- 2. Were RPDs correctly calculated?

 yes X

 no ____

$$RPD = \frac{S - D}{(S + D)/2} \times 100$$

- S = Sample
- D = Duplicate

.•		For sample concentrations >5x the CRDL, were RPDs $\pm 20\%$? (limits of $\pm 35\%$ apply for soil/sediment/tailings samples) yes X no NA
		For sample concentrations >5x the CRDL, did duplicate analysis results fall outside the control window of ± the CRDL? yes no X NA
		Where the RPDs exceeded the control limits, were the data flagged '*' on Forms I and VI by the laboratory? yes X no NA
	4.	Were raw data correctly transcribed onto Form VI? yes X no
	- Field - Duplic	Considerations: blanks cannot be used for duplicate analyses ates must be analyzed for each analytical method
	VII. La VI	boratory Control Sample (LCS) Analysis (guideline pg. E-12, Form I)
	1.	Was an LCS analyzed for every sample delivery group or batch of samples, whichever was more frequent? yes X no
	2.	Were recoveries within the 80-120% limit? yes X no
		-if the recoveries were outside this range the analysis must be terminated, the problem corrected and the previous samples associated with that LCS redigested and reanalyzed.
		Were the raw data correctly transcribed onto Form VII? yes X no
		II. Furnace Atomic Absorption (AA) QC Analysis (guidelines pg. 14, Form VIII)
	1.	injections per sample, the average values and the relative standard deviation (RSD)?
		yes X no
	2.	For analyte concentrations > the CRDL, did the RSD for the duplicate injections agree within 20%? (if yes, go to question 3)
		yes X no
		$RSD = \frac{SD}{M} \times 100$
		SD = Standard Deviation of Duplicate Injections M = Mean of Duplicate Injections

.*

	2 a .	Were samples that exceed	ed the 20% c	
	2 b .	Did any reanalyzed sampl	es exceed th	
	2c.	If yes, did the laborato		data of Form I with an
			yes	no
3.	Was	the recovery of the spik	e > 40%? (if	yes, go to question
			yes X	no
	If 1	no, was the sample dilute	d and rerun yes	with another spike? no
4.		sample absorbance >50% oquestion 5).	f spike abso	rbance?* (if yes, go
			yes _	no X
* Spike al	bsori	bance = absorbance of spi	ked sample -	absorbance of sample.
	4a.	For spike recoveries bet reported to the IDL?	ween 85 and	115%, were results
			yes X	no
		$RPD = \frac{(SSR - SR)}{SA} \times 100$		
		SSR = Spike Sample Recov SR = Sample Result SA = Spike Added	ery	
	4b.	For spike recoveries out results reported to the		
5.		spike recovery between 8 stion 6)	5 and 115%?	(if no, go to
	5a.	Were results quantified reported to IDL?	from calibra	tion curve and
			yes	no
6.		an MSA at 50, 100 and 15 lyzed?	0% of the sar	mple absorbance
		•	yes	no
	6 a .	Was each MSA analysis id with the slope, intercep	A CONTRACTOR OF THE CONTRACTOR	
	6b.	Were these data correctly	v transcribe	d onto Form VIII?

yes	no

<i>:</i>		6c. Were correlation coefficients(r) > 0.995? yes no
		6d. If no, were MSAs run once more? yes no
		- If the correlation coefficients were still > 0.995, data on Form I must be from the run with the best 'r' and the data on Forms I and VII must be flagged with a '+'.
		Were these criteria met? yes no
		6e. Were all MSA obtained data marked with an 'S' or an S+ on form I?
		yes no
IX.	ICP	Serial Dilution (L) Analysis (guidelines pg. E-12, Form IX)
	1.	Was an ICP serial dilution performed on each group of samples of a similar matrix (i.e., soil, water) and concentration (i.e., low, high) or for each sample delivery group, whichever was more frequent?
		yes X no
	2.	For elements with concentrations >10X the CRDL, did any exceed the serial dilution results by more than 10%? (if no, skip questions 3 and 4) yes X no //
		$% difference = \frac{I - S}{I} \times 100$
		<pre>I = Initial Sample Result S = Serial Dilution Result (instrument reading X5)</pre>
	3.	Which elements had concentrations that exceeded the 10% criteria? only those associated with undetected values or blank contaminanats.
	4.	Did the laboratory flag these data with an 'E' on Form IX? yes no
	5.	Were the raw data correctly transcribed onto Form IX? yes X no
X.	Inst	rument Detection Limits (IDL) (guidelines pg. E-13, Form XI)
	1. 7	Were IDLs reported for each analyzed element? yes X no
	2. \	Were IDLs reported for each instrument used? yes X no
		Did the IDLs meet the contract requirements? (refer to pg.

- XI. Interelement Corrections for ICP (guidelines pg. E-13, Form XII)
 - 1. Were correction factors reported on Form XII?

 yes X no
- XII. Linear Range Analysis (LRA) (guidelines pg. E-14, Form XII)
 - Was a linear range verification standard analyzed? yes X no ____
 - 2. Was the results within $\pm 5\%$ of the true value? yes X no ____

Holding Times

Limits: Metals - 6 months; Hg - 30 days; Cn - 28 days.

- 1. Verified date of sample receipt by laboratory 8-16-89
- 2. Date of preparation/analyses ICP 8-24-89

AS - 8-31-89

SE - 8-31-89

PB - 8-29-89

TL - 8-24-89

3. Were holding times met? yes X, for all but HG

U.S. EPA - CLP."

i		ryopcinto i	1_ Nalysis data sh	EET-	epa sample no.
	•	tuovante .	MILLER DE DE LES COMMENTES DE LA COMMENTA DEL COMMENTA DEL COMMENTA DE LA COMMENTA DEL COMMENTA DEL COMMENTA DE LA COMMENTA DEL COMMENTA DEL COMMENTA DE LA		DUDENA
Lab Name: SIL	VER VALLEY LABS	., INC.	Contract:	4500-801	MHP520
Lab Code: SIL	/ER Ca	se No.: [a	334 SAS No.:		SDG No.: MHP5
Matrix (soil/	vater): WAT	GL.		ab.Sampl	
Level (low/me	di: Lov	<u>U</u>	t	Date Rece	ived: 08/16/89
solids:	0.0	2			
C			L or mg/kg dry	weight):	UG/L
	DITCE STATE	011100 (-9)			Andreas -
	CAS No.	Analyte	 Concentration	[[н
	7429-90-5	Aluminum_	(34.71	UB	D WHE
		Antimony			TT:
	7440-38-2		3.47 40-0	3	D 30/89
		Barium	14.9	1,3	Place
•	7440-41-7	Beryllium	1.8	11	\underline{P}_1
	- 7440-43-9	Cadmium	1.8 4	11	区 !
	7440-70-2	, , , , , , , , , , , , , , , , , , , ,	830000.	18	Z LAN
	7440-47-3	Chromium	a.8 4	11	B Car
	7440-48-4	Cobalt	43.87	8.13	Plan
	7440-50-8	Copper	[1.2]	1	Plus
	7439-89-6	Iron	123,	11	<u>P</u> !
	7439-92-1	Lead		(RI)	E land
•		Magnesium	71200.	<u> </u>	P LAC
	7439-96-5			F	P AF
	7439-97-6		0.21	R	FILAF
	7440-02-0	Nickel	9.7 4		<u>P</u> l ::
	7440-09-7	Potassium	(aa 30 :)	1 100	P I as
	7782-49-2	Selenium_	12.0.1		El iař
		Silver	. 1.6]	<u>P</u> I
		Sodium	49600.1	В	P AF
	7440-28-0	Thallium_	0.9	1	E.I
	7440-62-2	Vanadium_	a,7lu		<u>R</u> !
	7440-66-6	Zinc	198.	B	P Jali
	Í	Cyanide_		.	<u>Mej</u>
				. .	!
Color Before:	Capliess	Clarit	y Before: OF	AR!	Texture:
Color After:	COLORIES	S Clarit	y After: UE	<u> </u>	Artifacts:
Comments:					

U.S. EPA - CLP

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS, INC.

Lab Code: SILVER

Case No.: 12334

SAS No.: 190

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

	!					:
ICAS No.	Analyte	Concentration	C	a	M	· }
1	1).		}.	•
17429-90-5	Aluminum	[16.5]	B	પક	; P	KAE
	Antimony	19.9	Ü		; P	: 3
	Arsenic	[3.8]	B	X	IF.	0375 1010000
17440-39-3	Barium	[52.9]	B	UB	IP_	LACOR
17440-41-7	Beryllium	1.1	U		IP.	وهم :
17440-43-9	Cadmium	9.2		3	I P	
17440-70-2	Calcium	199000		β	<u> </u>	luar-
17440-47-3	Chromium	2.8	U.		! P	1
17440-48-4	Cobalt	[2.6]	B	u <u>r</u>	<u> </u>]બરા≦
17440-50-8	Copper	<u>[1.57</u>	BY	μŊ	IP_	เมา
7439-89-6	Iron	<u> </u>	B	uß	<u>IP</u>	عمرانا
: <u>7439-92-1</u>	Lead	38.2		NSX F	<u>:E</u>	Wood
1 <u>7439-95-4</u>	Magnesium	39600			<u> </u>	light da
: <u>7439-96-5</u>	Manganese	<u>'1080 </u>		3	<u>: P_</u>	liag
: <u>7439-97-6</u>	Mercury	0.20	U.		:CY	270 UAF
: <u>7440-02-0</u>	Nickel :	9.7	<u>u</u> :		<u>:P_</u>	- 40 A
: <u>7440-09-7</u>	<u>Potassium</u>	<u>[3470]</u> [B	<u> </u>	<u> </u>	liar 5
: <u>7782-49-2</u>	Selenium :	14.7	R	NX (13)	LE_	laf
: <u>7440-22-4</u>	Silver :	1.6			LP_	;
: <u>7440-23-5</u>	Sodium :	41000	1		<u> </u>	
: <u>7440-28-0</u>	Thallium :	0.90	77		LE_	1-146
	<u> Yanadium_</u>		U.		<u> </u>	!
<u>7440-66-6</u>	Z <u>inc</u>	2360		$\mathcal{E}_{}$	IP_	<i>LAF</i>
	<u>Cyanide</u> :				INR	:
1			_ ;		1	!

Color Before: COLORLESS

Clarity Before: CLEAR

Color After:

COLORLESS

Clarity After: CLEAR

Comments:

E U.S. EPA - CLP

EPA SAMPLE NO.

INDRGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS.INC.

Contract: 43-68-6074

MHP522

Case No.: 12334

SAS No.:

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

Lab Code: SILVER

LOW

Date Received: 08/16/83

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

	r	,		1	1
CAS No.	: Analyte	Concentration:	(C) Q	i M	:
7429-90-5	' <u>Aluminum</u>	1740	·	P	CAF
7440-36-0	Antimony :	<u> 53.87</u>	BI UN	<u>: P_</u>	USE -
7440-38-2	'Arsenic	41.9		LE_	00 95
7440-39-3	Barium :	182.21	E Lib	<u>: P_</u>	LINE
7440-41-7	Beryllium	1.1	: <u>U.L.</u>	<u>: P</u> _	1
7440-43-9	Cadmium	16.0	1 1B	<u>: P</u> _	WF
7440-70-2	Calcium	206000	!_!B	IP_	ILAE
7440-47-3	Chromium :	2.8	: U:	LP_	1
7440-48-4	Cobalt :	[5.7]	B/I	LP_	تابدا
7440-50-8	Copper	71.4	13	LP_	Luf
7439-89-6	Iron	5320	1 1 3	<u> </u>	Haf
7439-92-1	Lead	1100	13	P_	lar
7439-95-4	Magnesium	42000	118	P_	LUTE
7439-96-5			18	LP_	luit
	4 h.d	2.2	INR	: CV	OP CAF
7440-02-0	Nickel	9.7	U.	: 2_	100
7440-09-7	Potassium	!31 <u>60</u>	B()	<u>: P</u> _	
7782-49-2	Selenium :	28.5	BINM*	F_	l;nf
7440-22-4	Silver	6.3	B13	<u> </u>	liar
7440-23-5	Sodium	42000	12	<u> </u>	کان ا
7440-28-0	Thallium	0.90	<u>u:</u>	LE_	1
7440-62-2	Yanadium :	15.52	B.	<u> </u>	l'ar
7440-66-6	Zinc	3790	13	IP_	lipp .
	Cyanide :		<u> </u>	INR	I
	!!			¦	!

Color Before: BROWN

Clarity Before: CLEAR

Texture:

Color After: BROWN

Clarity After: CLEAR

Artifacts:

lomments:

U.S. EPA - CLP

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS. INC.

L8-108-0074:

Lab Code: SILVER

Case No.: 12334

ma 10102/89 SAS Na .:

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

,					
: :CAS No.	: ! Analyte	: Concentration	: : :C: 0	i IM	1
1	!	!		!	
7429-90-5	Aluminum	18.2	કા હાલ	P	J-Ai ^c
1 <u>7440-36-0</u>		25.7		TP-	14
1 <u>7440-38-2</u>		[6.6]	BINW	<u>IF</u>	: 3°C
17440-39-3	Barium	61.5	B' lus	<u> </u>	4/00
17440-41-7	Beryllium	1.1	U:	<u> </u>	
17440-43-9		5.07	B! UK	<u>:P</u>	Lets-
17440-70-2	Calcium :	211000	B	I P	LAF
17440-47-3	Chromium :	2.8	U:	<u>: P_</u>	1
7440-48-4	Cobalt :	[3.5]	Billis	12	lutif
17440-50-8	Copper	$\int 1.27$	B' uis	<u> </u>	LUF
17439-89-6_1	Iron	\ <u>\63.21</u> \	B' ui	<u> </u>	When
:7439-92-1_:	Lead	48.3	1 188 ES	1E_	1000
: <u>7439-95-4</u>	Magnesium	41400		<u> </u>	1-10
1 <u>7439-96-5</u>	<u>Manganese</u> :			<u>LP</u>	LUTES LAF
	Mercury :	0.20_	UIN R		
: <u>7440-02-0</u>	Nickel :	13.97	RI	<u> </u>	HAP SON
	<u>Potassium</u> :	<u> </u>	B! ny	<u>: P</u> _	line 3
: <u>7782-49-2</u> :		12.6]	BIN* UK	<u>LF</u>	LAIF
: <u>7440-22-4</u> _:	<u>Silver</u>	1.6		12_	1
	<u>Sodium</u> :	42300		LP_	
: <u>7440-28-0</u> :	<u>Thallium</u> :	0.90		LE_	
	<u>Vanadium</u> :	2.7_	~~~~~~	LP_	
<u>7440-66-6</u>	Zinc	1730			Las-
	Cyanide:			<u>LNR</u>	:
!		;	_ !	!	1

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS, INC.

Case No.: 12334

SAS No.:

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

Lab Code: SILVER

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

		, ., ., ., ., ., ., ., ., .,				r
CAS No.	: : Analyte	Concentration	C	Q	M	1
	·		<u>'</u> —		!=-	i
1 <u>7429-90-5</u>	: <u>Aluminum</u>	<u> </u>		<u>B</u>	<u> </u>	
1 <u>7440-36-0</u>	: <u>Antimony_</u> :	<u> </u>	۱	13	<u> </u>	(Alt.
1 <u>7440-38-2</u>	Arsenic	<u>619</u> _	١	<u> </u>	<u>:P</u> _	
: <u>7440-39-3</u>	Barium	881	١	<u> </u>	<u> </u>	kurt.
17440-41-7	Beryllium	[2.4]	E.		<u>: P</u> _	1
17440-43-9	:Cadmium	137_	ا ا	1B	<u>: P_</u>	luti
17440-70-2	:Calcium	248000	¦	В	; P	LAF
	Chromium	72.2	:	 	TP-	` .
	Cobalt	[27.0]	B.		; P	LHE
	Copper	1390	·	3	; P	LAG
	Iron	98500		3	IP_	Lar
7439-92-1	Lead	20000	_	2 .)	IP_	Luste
17439-95-4	Magnesium	68400	; <u> </u>	3	;P	LHF
17439-96-5	Manganese	3080		B	IP_	LAC
17439-97-6	Mercury	39.2	!	NR	CV	STAR LAF
17440-02-0	Nickel	67.3			IP.	· OSTO
	:Potassium:	8980	!	13	IP_	lue
17782-49-2	Selenium	[34.2]	E	N* u.i	IF_	l mê
17440-22-4	Silver :	131	i	13	۱2	Life
	:Sodium :	42900	!	1B	IP_	LAF
17440-28-0	Thallium	[4.7]	B	W	IE	HF
17440-62-2	:Vanadium :	129			; P_	1
17440-66-6	Zinc :	19300		3	<u> </u>	liaf .
	Cyanide :				INR	1
!	1					!
·						

olor Before: BROWN

Clarity Before: OPAQUE Texture:

Color After: **BROWN** Clarity After: OPAQUE

Artifacts:

_omments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS. INC.

රි-*ග*්-*0*074 Contract: (රි. වි.) 071 MHP525

Lab Code: SILVER

Case No.: 12334

SAS No.:

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No. Analyte Concentration C Q M	
7.00 00 5 1.00 1.00	
- 1 智 4 G G G G G G G G G G G G G G G G G G	
7429-90-5 Aluminum	
7440-36-0 Antimony 19.9 U P	
17440-38-2 Arsenic 17.2] BINW	
7440-33-3 Barium	
7440-41-7 Beryllium 1.1 U P	
7440-43-9 Cadmium 1.8 U	
7440-70-2 Calcium 132000 B P WF	
7440-47-3 Chromium 2.8 U P	
7440-48-4 Cobalt	
17440-50-8 Copper 1.1 U	
7439-89-6 Iron	
17439-92-1 Lead 9.2 INS BUIF 17439-92-1 NS BUIF 17439-92-1	
17439-95-4 Magnesium 34700 B P P	7
17439-96-5 Manganese 20.3 18 1P M	
17439-97-6 Mercury 0.20 UIN & CV 0300	af-
رة (P 9.7 U P المحادث 7440-02-0 Nickel	
17440-09-7 Potassium 1820] B 18 P Laf	0
17782-49-2 Selenium 115.41 B N* F Lair	
1440-22-4 Silver 1.6 U P	
7440-23-5 Sodium 19700	
:7440-28-0 :Thallium : 0.90 :U: :F :	
17440-62-2 Vanadium	
17440-66-6 Zinc 64.1 B P LAF	
Cyanide	

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: CO

COLORLESS

Clarity After: CLEAR

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

1400-8014 B

Lab Name: SILVER VALLEY LABS, INC.

674

Lab Code: SILVER Case No.: 12334

SAS No.:

SDG No.: MHP520

Matrix (soil/water): WATER

Level (low/med): LOW

Lab Sample ID:

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

!	!	 !		 !		!
CAS No.	Analyte	Concentration	C	-	M	
7429-90-5	Aluminum	26.3	<u></u>	, lb	P	LHE
17440-36-0		19.9	١Ū١		<u> </u>	۱
	Arsenic	[7.7]	B		F	I LA
17440-39-3	Barium	61.97			P	W. Floren
	Beryllium	1.1	: Ū)	- 	[2]	;
	Cadmium	1.8	וַטוּ		[P]	1
17440-70-2		131000			; P	int.
17440-47-3		2.8			<u> </u>	:
17440-48-4		2.6	: <u>U</u>		P	:
17440-50-8	Copper	(2.4)	B	li ß	; P_	Har.
17439-89-6		[84.7]	B	with	P_	(.d)
17439-92-1	Lead	0.931	B	NW Just	E	S. AL
17439-95-4	Magnesium	34400		u.	<u> </u>	Inter of
17439-96-5	Manganese	19.1	- 1	13	P_	Lar
17439-97-6	Mercury	0.20	U	N R	CY	1 MBLAF
17440-02-0	Nickel :	9.7			<u> </u>	
17440-09-7	Potassium	2110	B	ti Ř	P_	1:45 89
17782-49-2	Selenium_:	15.27	B	N* co	LE_	luir
17440-22-4	Silver	1.6	<u>u:</u>		LP_	:
17440-23-5	Sodium	19700	1	; ;	P_	;
1 <u>7440-28-0</u>	Thallium_:	0.90	<u>U:</u>		E_	:
17440-62-2	<u>Vanadium</u>	2.7.			P_	1
17440-66-6	Zinc	52.7			<u>P</u> _	
·	Cyanide!				NR	ł
	;		_ i			!

olor Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS, INC.

Contract: -55-29-0071

MHP527

Lab Code: SILVER

Case No.: 12334

545 NO 100

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

1	:	•	1	:	ł	:
CAS No.	! Analyte	Concentration	C	e a	: M	;
İ			!_	:		- !
1 <u>7429-90-5</u>	Aluminum_	43400	١	18		. Lar
: <u>7440-36-0</u>	: Antimony	199_	١	13	<u> </u>	_liuf
1 <u>7440-38-2</u>	:Arsenic	540	١		<u> : P</u>	_1
17440-39-3	Barium	788_	i	B	<u> </u>	KHF
17440-41-7	Beryllium	[2.1]	8	<u> </u>	¦₽	LAF
17440-43-9	:Cadmium	127		13	<u> </u>	LAF
1 <u>7440-70-2</u>	:Calcium_	246000	١	.g.	; P	LAF
17440-47-3	Chromium	68.5	:		; P	1
: 7440-48 <u>-4</u>	Cobalt	[28.4]	B	C118	; P	LAF
17440-50-8	Copper	1260	:	175	: P	luir
: <u>7439-89-6</u>	!Iron	89300	!	13	; P	IUNE
: <u>7439-92-1</u>	Lead	17900	!	15 .)	; P	LAF
: <u>7439-95-4</u>	Magnesium	67100	:	3	; P	luté
: <u>7439-96-5</u>	Manganese			3	; P	luit
	Mercury	36.0	:	NR	ICV	300 LATE
: <u>7440-02-0</u>	Nickel	57.3			1,12	1 700
: <u>7440-09-7</u>	:Potassium	8770		ָל ן	; P	lini on
	Selenium	(43.9)	B	N* ur	i F	luté >
17440-22-4	Silver	117		75	; P	luif
1 <u>7440-23-5</u>	Sodium	42700			; P	
1 <u>7440-28-0</u>	Thallium	[4,2]	B	W	i F	146
1 <u>7440-62-2</u>	Vanadium	121			; P	1
1 <u>7440-66-6</u>	Zinc	17700		3	; P	luif
1	Cyanide :				INR	1
!						•

Color Before: COLORLESS

Clarity Before: CLEAR

Taytura.

Color After:

COLORLESS

Clarity After: CLEAR

Artifacts:

U.S. EPA - CLP Stage

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

6.W8-0074

Lab Name: SILVER VALLEY LABS, INC.

Lab Code: SILVER

Case No.: 12334

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

					Ī	!
CAS No.	Analyte !	Concentration	: C :	. Q	: M :	1
7429-90-5	Aluminum	128.01	B	'(f)	<u> </u>	Hat
1 <u>7440-36-0</u>	Antimony_	<u> </u>	B	- CB	<u> </u>	12
17440-38-2		(5.6)	B	NW	F	City City
17440-39-3		[60.87]	8	lug.	! P_	1 One un i
7440-41-7		1.1	: 03		[P	1 9
17440-43-9		6.0		3	; P	lini
17440-70-2		211000			<u> </u>	LAF
17440-47-3		2.8	١ŪΪ		I P	:
:7440-48-4		(5. 3 <u>1</u>	8	1,415	P	LAF
7440-50-8		۲1.27			F_	lakir
; <u>7439-89-6</u>		55.1	B	CuB	P	م مكلانا
. = . = . = . = .	Lead	34.6			F	200
	Magnesium	41400		<i>1</i> 5.	[P]	LUIF
	Manganese:	1180	-	1,2	. P	KHE_
	Mercury	0.20	Ū	N R	īÇV	BROWE
	Nickel :	9.7	ıŪ.		; P	70
17440-09-7		3060]	8	LeB .	P	I'MI A
17782-49-2	Selenium :	15.1	B	NW* +==	F_	inst .
17440-22-4	Silver :	1.6	i Ü i		: P_	:
17440-23-5	Sodium !	41200			: P_	;
	Thallium :	0.90	Ū		F_	*
17440-62-2	Vanadium_	3.87	B		P_	iur:
17440-66-6	Zinc :	1730 :			P_	lui
	Cyanide :				NR	1
\;			_;		l	1

olor Before: COLORLESS

Clarity Before: CLEAR

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

bmments:

EPA SAMPLEINO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS, INC.

Contract: 68-08-0074

MHP529

Lab Code: SILVER

Case No.: 12334

SAS No.:

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	 Analyte	 Concentration	C	Q	i iM	[]
; ; <u>7429-90-5</u>	Aluminum	[24.9]	Ē	un	;	 U16
	Antimony	19.9			P	1
7440-38-2		2.3			IF.	338
7440-39-3	Barium	1.3	<u>u</u>		18_	200
7440-41-7	Beryllium		U.		<u> </u>	938 94
	<u>Cadmium</u>	1.8			<u> </u>	;
	Calcium	$\frac{(214)}{3}$				LAF
	: <u>Chromium</u> :Cobalt	2.8 2.6			<u> </u>	i 1
	Copper		Ü.		; P	! !
17439-89-6	Iron) 64.2(P	6 <u>4</u> 5
7439-92-1	Lead			NA WH.		STATE IN
17439-95-4	Magnesium	₩3.71	8	Lift	I P	KAF 87
	<u>Manganese</u>					نهات
	Mercury	0.20			TĒĀ	OP LAF
	Nickel	<u>9.7</u> _{			<u> </u>	000 A
<u>7440-09-7 </u>		273 ; 1.2 ;			<u>:P</u> _	99
	Selenium Silver	1.6			<u> </u>	; — /11 !
	Sodium	[47.5]			P	LAF
	Thallium	0.90			F	: [
	 Vanadium	2.7			P	<u> </u>
7440-66-6	Z <u>inc</u>	12.6]	B		IP_	
!	Cyanide				<u>INR</u>	
			_ ;		·	}

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

HAS U.S. EPA - CLP MARK

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

68-408-0074

Lab Name: SILVER VALLEY LABS, INC.

1795010481

Lab Code: SILVER

Case No.: 12334

SAS No.:

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

7440-02-0 Nickel	CAS No.	: Analyte	 Concentration	C	Q	i M	1 } 1 1
7440-38-2 Arsenic 2.3 U N							i Laf
7440-39-3 Barium							2008
7440-43-9 Cadmium	7440-39-3	Barium :	1.3	<u>u:</u>		12	9/03/89
							•
	7440-70-2	:Calcium;	[136]	B	WIZ	<u> </u>	
7440-50-8 Copper							i !
	7440-50-8	Copper :	1.1	<u>ū</u>			! VAF
7439-95-4 Magnesium							1000 AF
7440-02-0 Nickel 9.7 U P	7439-95-4	<u>Magnesium</u>					
17782-49-2 Selenium							. man
7782-49-2 Selenium							108/89
7440-23-5 Sodium 13.2 U P							
:7440-28-0 :Thallium : 0.90 :U: :F :					• • • • • • • • • • • •		liar !
!7440-62-2 !Vapadium ! 2.7 !!!! !P !			0.90:	<u> </u>		E	
17440-66-6 Zinc [6.5] B W P WF					·	<u>P</u> _	
Cyanide L NR		. =					

Color Before: COLORLESS

Clarity Before: CLEAR Texture:

Color After:

COLORLESS

Clarity After: CLEAR

Artifacts:

1 INORGANIC ANALYSIS DATA SHEET EPA SAMPLE NO.

المن دائي . Contract: <u>دو کي دو کي </u>

MHP532

Lab Name: SILVER VALLEY LABS, INC.

Case No.: 12334

SAS No.:

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

Lab Code: SILVER

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

						•
: :CAS No	: Analyte	: Concentration	C		: M	; ;
1	!	!			!	:
7429-90-5	Aluminum	23.0]	B	L13	P	l-df
	Antimony	19.9	Ü		P	l
17440-38-2	Arsenic	12.97	B	NE	F	LUFTING THE
17440-39-3	Barium	[37.3]	B	นซี	P	INTERPORT
17440-41-7	Beryllium	1.1	י ט		P	· PA
17440-43-9	Cadmium	1.8	Ū		; P	1
17440-70-2	Calcium	321000	-		P_	1
:7440-47-3	Chromium	2.8	: Ū		P	1
17440-48-4	Cobalt	(6.37)	8	uB .	P	la F
17440-50-8	Copper	[1.2]	8	しゅ	P	l LAT
17439-89-6	Iron	503		B	P	سيطين
7439-92-1	Lead	0.90	ַ עַ	NMX	F	Say I
17439-95-4	:Magnesium	56100	<u></u>	72	Ρ_	lutí Op
	Manganese	12900		13	P	LAF
. =	Mercury	0.20	<u>Ū</u>	Ne	CV	3 LAF
17440-02-0	Nickel	9.7	<u>U</u>		P	930
17440-09-7	Potassium	5380			P_	
17782-49-2	Selenium :	12.0	U:	NW*	E_	SAN
: <u>7440-22-4</u>	Silver	1.6	U:		P	1
17440-23-5	Sodium	60000	_1	R	P_	いみそ
17440-28-0	Thallium :	0.90	<u>U:</u>		E_	1
7440-62-2	<u>Vanadium</u>	2 <u>.7</u>	U:		P_	:
17440-66-6	Zinc :	[19.8]	B:	iva l	P	:U1E
1	Cyanide				NR	!
1			_;			†

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After:

COLORLESS

Clarity After: CLEAR

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

4500-8m-89 Contract: - GB

Lab Name: SILVER VALLEY LABS, INC.

SAS No.:

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med): LOW

Lab Code: SILVER Case No.: 12334

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	! Analyte 	 Concentration 		! ! M !	:
7429-90-5	Aluminum	317	18	_ <u> P</u>	السماة
7440-36-0_	Antimony_	19.9	<u>'U</u>	LP_	1
7440-38-2	<u>Arsenic</u>	33.1	_ <u>:\NS</u>	_iF_	333
7440-39-3	Barium	<u> </u>	<u> </u>	<u> :P</u>	LUIT OF BY
7440-41-7	Beryllium		<u> </u>	<u> </u>	, ,,,
7440-43-9_	Cadmium	<u> </u>	BY CIA	<u> </u>	7:1:
7440-70-2	Calcium	<u>369000</u>	<u> </u>	12	inst
7440-47-3	Chromium	<u>2.8</u>	<u> UI</u>	12_	1
7440-48-4	Cobalt	(5.67)	<u> </u>	_ <u> </u>	HF
7440-50-8	Copper	[<u>[6.6]</u>	B. UB		liaf
7439-89-6_	Iron	10200	1 R	<u> </u>	July 1
7439-92-1	Lead	<u> </u>	N8 B	JLE_	- الحن
<u>7439-95-4</u>	<u>Magnesium</u>	<u> 58800 </u>	1 B		luit Too
<u>7439-96-5</u>	<u>Manganese</u>	<u> 21400 </u>			L'AF
<u>7439-97-6</u>	Mercury_	0.20	<u> U: R</u>	<u> </u>	: LAF
<u>7440-02-0</u> _3	Nickel :	9.7	ــــــــــــــــــــــــــــــــــــــ	<u> </u>	;
<u>7440-09-7</u>	<u>Potassium</u> :			<u> : P</u> _	i
	Selenium_	18.5	BINM* 44		Af
<u>7440-22-4_</u> ;	<u>Silver</u> :	1.6		<u> </u>	1
	Sodium	~~~~~~~~	<u> </u>	<u> : P</u> _	! SF
	<u>Thallium_</u>	0.90		<u>:E</u>	;
	<u> Yanadium</u>	2.7_3		<u>:P</u> _	!
<u>7440-66-6</u>	Zinc	759_	B	<u> </u>	
	Cyanide;	!		<u> </u>	<u> </u>
	;		_	_;	į.

Color Before: YELLOW

Clarity Before: CLOUDY

Texture:

color After: YELLOW

Clarity After: CLOUDY

Artifacts:

comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

•

Case No.: 12334

4-WY-0074

MHP534

Lab Name: SILVER VALLEY LABS, INC.

Contract;

SAS No.:

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

Lab Code: SILVER

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

!	!		!			!
CAS No.	Analyte	Concentration	C	Q	M	1
1	<u> </u>				!=-	1
7429-90-5				UB	<u> </u>	LA:
<u> 7440-36-0</u>			<u> </u>		<u>: P_</u>	i og f
: <u>7440-38-2</u>		2.3_			<u>:E</u>	378
: 7 <u>440-39-3</u>	:Barium :	1156.71	8	UB	<u>: P_</u>	UT CO
: <u>7440-41-7</u>	Beryllium:	1.1	<u>: U</u>		LP_	30
17440-43-9	Cadmium_	10.3	<u> </u>	<u>B</u>	<u>: P</u> _	ilaf /
17440-70-2	Calcium	205000	! _ }	В	; P	LAF
17440-47-3	Chromium	2.8	: עו		; P	!
	Cobalt	∫3.17	g'	UB	IP.	LUFF
17440-50-8	Copper	<u> </u>	13	is B	! P	LAF
	Iron	(31.5)	B	นหื	P	1-40
	Lead	(1.4]	B	NX Lis j	IE_	I DI HE
: <u>7439-95-4</u>	:Magnesium:	40400	! _ !	<u>B</u>	LP_	LUF 69
	<u>Manganese</u>			は	۱2	iuaf
1 <u>7439-97-6</u>		0.20	Ū	NR	CV	3 Ser LAF
	Nickel	9.7	Ū		1 2	20
	Potassium:		8		I P	OF CAF
	Selenium	\2.77			IF_	luat >
	Silver	1.6	Ū		i P	;
	Sodium				IP.	liaf
17440-28-0	Thallium	0.90	Ū		F	1.
17440-62-2	Vanadium	2.7	Ū		TP-	;
	Zinc	2970			P	KAF
	Cyanide		-	· ·	INR	!
						!
			- '			

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: C

COLORLESS Clarity After:

r: CLEAR

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS, INC.

3 01014

Lab Code: SILVER

Case No.: 12334

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	: Analyte !	: Concentration !	C	Q	! : M !	i !
7429-90-5	Aluminum	[61.1]	<u></u>	1.33	IP.	I.AF
17440-36-0		19.9	: U :		<u>: P</u>	۱
7440-38-2		[5.6]	E/		:F	MABILAF
17440-39-3		756.07			<u>: P</u>	9/03/AF
7440-41-7					; P	1 39
7440-43-9		10.3			; P	LAF
7440-70-2		205000			ī P	
7440-47-3		2.8			ī P	1
7440-48-4		[3.5]		·	P	l: Aē
7440-50-8		74.97			P	
17439-89-6		496				2 Lief
17439-92-1		25.2		NS TO	F	JIF .
17439-95-4					P	والقاين
17439-96-5		1080		·	ī P	
	Mercury :	0.20			İCV	
17440-02-0		(10.6)				U (0) A "
17440-09-7					<u> </u>	108 89
: <u>7782-49-2</u>		1.2			F	!
	Silver	1.6			<u> </u>	!
17440-23-5		41900			P	!
17440-28-0	Thallium :	0.90			F	· !
		2.7_1			<u> </u>	<i>t</i> 1
	<u>Vanadium</u>	3130			P	! !⊹a≿
	Zinc		-+		NR	
	CXaDide		-+		1777	! !
'i	i		- '		'	•

Color Before: COLORLESS

Clarity Before: CLEAR Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS, INC.

Contract: 60-03-0074

MHP537

Lab Code: SILVER

Case No.: 12334

SAS No.:

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

i LCAC No	; A = = 1b=				i ha	
CAS No.	: Analyte	Concentration:	اسا	. Q	¦M	1
17400-00-5	!	[49.5]		1.45	¦ =-	i 11 11 5
17429-90-5						iuke i
17440-36-0 17440-38-0		19.9 2.3			<u> </u>	320
	' <u>Arsenic</u>	[<u>: E</u> _	26.
<u> </u>						1011
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					<u> </u>	7
17440-43-9_		13.3			<u> </u>	
1 <u>7440-70-2</u>		228000			<u> </u>	
7440-47-3		<u> </u>			<u> </u>	
17440-48-4		<u> </u>	/		<u> </u>	
	Copper				<u> </u>	·
	Iron	346				300
	Lead	8.8			!E_	The same
	<u>Magnesium</u>				<u> </u>	line . 67
; <u>7439-96-5</u>					<u> 12 -</u>	וויו
	Mercury	0.20			<u> LCV</u>	OF LAF
	Nickel		ΠÌ		<u> P</u>	5
	: <u>Potassium</u> :			~	<u> </u>	
	Selenium_	20.01			<u>LF</u>	int -
1 <u>7440-22-4</u>	<u> Silver</u>	1.6	Ų,		<u> </u>	1
: <u>7440-23-5</u>	Sodium	48000		<u>B</u>	<u>LP</u>	LIF
7440-28-0_1	Thallium	0.90	<u>U</u>		LF_	1
: <u>7440-62-2</u>	<u> Yanadium</u>	2.7	U.		<u> </u>	!
: <u>7440-66-6</u>	Zinc	3880		B	iP_	luf
	Cyanide				INR	1
	l		_ [1	!

Color Before: COLORLESS

Clarity Before: CLEAR

Color After:

COLORLESS

Clarity After: CLEAR

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS, INC.

Contract: 48 D9

1. 电放射

SDG No.: MHP520

Lab Code: SILVER

Case No.: 12334

SAS No.:

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	: Analyte 	: Concentration 	: : : : : : : :	Q	: : M :	; ;
7429-90-5	Aluminum	29.07	B.	いは	P	alt
17440-36-0		19.9	<u>: آن</u>		P	۱ م
17440-38-2	Arsenic	2.3			F	0375
17440-39-3	Barium	[1.7]	B':	LB	2	lint of
7440-41-7	:Beryllium	1.1	<u> U:</u>		P_	; **
17440-43-9	Cadmium	1.8	נייי ו		2	1
17440-70-2	Calcium	[109]	B1	uв	2	1616
17440-47-0	Chromium	2.8	U.		P	;
: <u>7440-48-4</u>	:Cobalt	2.6	<u>U:</u>		P_	!
17440-50-8	:Copper	1.1	<u>: U :</u>		P_	1
17439-89-6	Iron	(33.47)	B7	43	2_	10th
17439-92-1	Lead	1.33	B.	NW & Luis	E_	1000
17439-95-4	<u>Magnesium</u>	38.67	181	UI .	<u>P_</u>	المارة المارة
: <u>7439-96-5</u>	<u>Manganese</u>	<u> 12.01</u>	31		2	Lichia
:7439 <u>-</u> 97 <u>-6</u>	Mercury	<u>0.20</u> ;	<u>U.</u>	X.R.	CY	1 078 par
1 <u>7440-02-0</u>	Nickel	9.7	<u>U1</u>		P_	;
: <u>7440-09-7</u>	<u> Potassium</u>	273_	<u>:</u> U		P_	1 36
: <u>7782-49-2</u>	' <u>Selenium</u> :	1.2			E_	
1 <u>7440-22-4</u>	Silver	1.6_		ء سے سے جب جب جب ہے ۔	LP_	1
1 <u>7440-23-5</u>	Sodium	[41.87]	BI			LAG
1 <u>7440-28-0</u>	<u>Thallium</u>	0.90	ΠŢ		E_	1
1 <u>7440-62-2</u>	: <u>Vanadium</u>	2.7_			2_	:
<u>7440-66-6</u>	Zinc	[2.9]	<u>B.I.</u>		2_	
	Cyanide				NR	1
			_ !			1

Color Before: COLORLESS

Clarity Before: CLEAR

Color After:

COLORLESS

Clarity After: CLEAR

Artifacts:



EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS, INC.

MHP538

Lab Code: SILVER

Level (low/med):

Case No.: 12334

SAS No.

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Date Received: 08/16/89

% Solids:

0.0

LOW

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	i ! Amnlukm	Concentration	ic: o	im i
ICAS NO.	. WHETACE	, Concentration	1 L 1 L 1 L 1 L 1 L 1 L 1 L 1 L 1 L 1 L	1 1
7429-90-5	'	29.6		P LINE
		20.1		1P (a)
	Antimony_			
	Arsenic			F 395
	Barium	<u>51.1`</u>		IP P
	Beryllium			IP P
	<u>Cadmium</u>	13.5		IP_lulf
	<u>Calcium</u>	218000		IP luit
	Chromium_	··	<u> UL</u>	<u>!P_</u> !
	Cobalt	(5.3]		<u> </u>
<u> </u>	Copper	[1.5]		<u> </u>
1 <u>7439-89-6</u>	:Iron	<u> </u>		IP ILAT
7439-92-1	Lead	` <u>0.90</u>	I U I DHAY	IF BOINT
1 <u>7439-95-4</u>	:Magnesium	39900	1 13	IP luit 09
17439-96-5	: Manganese	/1330	1 10	TP_TuiF
17439-97-6	Mercury_	0.20	UINR	ICY BOLAF
17440-02-0	Nickel	9.7	: U :	IP : 096
17440-09-7	Potassium	3570	B156	IP luni de
	Selenium			IF fair
	Silver	1.6	: U I	<u> </u>
	Sodium	46400		ip lurf
	Thallium_			;F
	Vanadium_	2.7		i P
	Zinc	3720 H		ip har
: :	Cyanide			INRI
			: - :	<u> </u>
'	' '	''	'-'	' '

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After:

COLORLESS

Clarity After: CLEAR

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS, INC.

Lab Code: SILVER Case No.: 12334

SAS Na.

SDG No.: MHP520

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

	!	1		1	:
CAS No.	Analyte	Concentration	ici a	M	! !
<u>7429-90-5</u>		127.07	B: 103	<u> </u>	i Laf
<u>7440-36-0</u>	Antimony .	1 <u>19.9</u>	7.	<u>: 2_</u>	300
7440-38-2	Arsenic	2 <u>.3</u>	U INW	<u>F</u>	0900
7440-39-3	Barium	1.3	<u> U:</u>	<u>: P</u> _	9
7440-41-7	Beryllium	1.1	<u> </u>	<u> </u>	;
7440-43-9	Cadmium	1.3	<u> </u>	<u>: P</u> _	1
7440-70-2	Calcium	(90.8)	B! UB	<u> </u>	lui F
7440-47-3	Chromium	2.8	U:	<u> </u>	:
7440-48-4	Cobalt	<u>[2.7]</u>	EP! UB	<u> </u>	KAF
7440-50-8	Copper	1.1	<u>U.</u>	LP_	!
7439-89-6		[32.2]	Blub	<u> </u>	مسكت
7439-92-1	Lead	0.90	UINWAL	F_	1
7439-95-4	Magnesium	137.81	BY! WH	<u>: P_</u>	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7439-96-5			Bluis	<u>: P</u> _	: Life
7439-97-6			UINR	<u>:CY</u>	OFFIAF
7440-02-0	Nickel	9.7		12	LAF
7440-09-7	Potassium	14374	평 : ს.ა	12_	THE PS
7782-49-2	Selenium_	1.2	U!NM*	<u>!F_</u>	ling
<u> 7440-22-4 </u>	Silver	1.6	U!	<u>: 2_</u>	į.
7440-23-5	Sodium	[13.3]	B 1 03	<u> </u>	LAF
7440-28-0	Thallium	0.90	U!	1F_	,
<u>7440-62-2</u>	<u>Vanadium</u>	2.7	<u>u:</u>	<u>: P_</u>	t i
7440-66-6		1.3		<u>:P</u> _	;
	Cyanide :			INR	1
				!	1

olor Before: COLORLESS

Clarity Before: CLEAR Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

recycled paper recycled paper recycled paper ecology and environment ecology and environment ecology and environment

REGION VIII SUMMARY OF DATA QUALITY ASSURANCE REVIEW

guideline references are from Contract #787

Case No.: 12334

TDD No.: F08-8909-08

Site: Richardson Flats

Contractor Laboratory: Keystone-Houston

Data Reviewer: Annette Sackman

Date of Review: 10-3-89

Sample Matrix: 19 Low Waters

Analysis: Mercury

MHP520, MHP521, MHP522, MHP523, MHP524, MHP525, MHP526, Sample Nos.:

MHP527, MHP528, MHP529, MHP530, MHP532, MHP533, MHP534,

MHP535, MHP537, MHP538, MHP539, MHP540

- (X) Data are acceptable for use.
- () Data are acceptable for use with qualifications noted.
- () Data are preliminary pending verification.
- () Data are unacceptable.

Action required by DPO?

The following items require action: No X Yes

Action required by project officer?

No X Yes

The following are our findings:

All requirements were met for the mercury analysis except Form VII - Laboratory Control Sample was not included. Since the LCS was analyzed and reported in the raw data and met all other requirements, no action is taken.

Inorganic Data Completeness Checklist

- X Inorganic analysis data (Form I)
- X Initial calibration and continuing calibration verification (Form IIA)
- CRDL standard for AA and ICP (Form IIB)
- X Blanks (Form III)

 ICP interference Check sample (Form IV)
- X Spike sample recovery (Form VA)
 Post digestion spike sample recovery (Form VB)
- X Duplicates (Form VI)
- X Laboratory control sample (Form VII)
 Standard addition results (Form VIII)
 ICP serial dilutions (Form IX)
- X Holding times (Form X)
- X Instrument detection limits-quarterly (Form XI)
- X ICP interelement correction factors-quarterly (Form II)
- X ICP linear ranges-quarterly (Form XIII)
 Raw data for interference checks
- X Raw data for calibration standards
- X Raw data for blanks
 Raw data for CRI and/or CRA
- X Raw data for samples
- X Raw data for duplicates
- X Raw data for spikes
- X Traffic reports

Contract Compliance

- I. Initial and Continuing Calibration Verification (ICV and CCV) (guidelines pg. E-4, Form IIA)
 - 1. Was instrument calibrated daily and each time it was set up?

 yes X no
 - Were instruments calibrated using 1 blank and several standards?
 yes X no
 - 3. Were calibration verifications within 90-110%? yes X no
 - 4. Were continuing calibrations run at 10% frequency?

 yes X

 no
- 5. Were the raw data correctly transcribed onto Form IIA?

 yes X no

 Comments: All requirements met.
- II. CRDL Standards for ICP (CRI) and/or AA (CRA) (guidelines pg. E-6, Form IIB)
 - 1. For ICP analysis, were standards (CRI) @ 2x the CRDL or the IDL (whichever was greater) analyzed at the beginning and the end of each sample run, or at a minimum of twice/8 hour shift, whichever was more frequent?

yes no

- 2. For furnace AA analysis, were standards (CRA) analyzed at the beginning and the end of each sample run, or at a minimum of twice/8 hour shift, whichever was more frequent? yes no
- 3. Were the CRI and/or CRA standards analyzed after the ICV? yes no
- 4. Were these data reported on Form IIB?

 yes

 no
- 5. Were the raw data correctly transcribed onto Form IIB? yes no Comments: Not required.

III. Blanks (guidelines pg. E-6, Form III)

- 1. Was the initial calibration blank (ICB) analyzed immediately after the initial calibration verification (ICV)?

 yes X no
- 2. Was a continuing calibration blank (CCB) analyzed immediately after each continuing calibration verification (CCV)?

 yes X no
- 3. Was a preparation blank (PB) analyzed at a frequency of at least 1 in 20 samples?

 yes X no NA
- 4. How many elements were detected above the CRDLs? 0 (if 0, go to question 5)
 - 4a. How many elements were detected in the blanks at greater than one-half the amount detected in any sample?
- 5. Were raw data correctly transcribed onto Form III?

 yes X no

 Comments: All requirements met.
- IV. ICP Interference Checks (ICS) (guidelines pg. E-7, Form IV)
 - Was the ICS analyzed twice per 8 hour shift? yes no
 - 2. Were the ICSs analyzed before and after samples? yes no
 - 3. Was any massive interference detected? yes no
 - 4. Were the ICSs within $\pm 20\%$ mean value? yes no
- 5. Were raw data correctly transcribed onto Form IV?
 Comments: Not required.

V. Spike Sample Analysis (S) (guideline pg. E-8, Form V)

- 1. Were spikes analyzed at a frequency of 1 in 20 samples?

 yes X no
- 2. Were spike recoveries correctly calculated?

 yes X no

$$x = \frac{(SSR - SR)}{SA} \times 100$$

SSR = Spiked Sample Result

SR = Sample Result

SA = Spike Added

- 3. Were spike recoveries within the range of 75-125%? yes X no
 - 3a. For recoveries outside this range, were associated data flagged "N" by the laboratory on Forms I and V?

 yes no NA X
 - (an exception if granted where the sample concentration is >4X the spike concentration)
 - 4. Were raw data correctly transcribed onto Form V?

 yes X no
- * Refer to page E-9 (SOW 787) for information regarding the amount of spike to be added for each analyte and for other information about the Spike Sample Analysis.

Comments: All requirements met.

VI. Duplicates (D) (guidelines pg. E-11, Form VI)

- 1. Were duplicates analyzed at a frequency of 1 in 20 samples?

 yes X no
- 2. Were RPDs correctly calculated?

 yes X

 no

$$RPD = \frac{S - D}{(S + D)/2} \times 100$$

S = Sample

D = Duplicate

- 3a. For sample concentrations >5x the CRDL, were RPDs ±20%? (limits of ±35% apply for soil/sediment/tailings samples)

 yes X no NA
- 3b. For sample concentrations >5x the CRDL, did duplicate analysis results fall outside the control window of ± the CRDL?

 yes no X NA
- 3c. Where the RPDs exceeded the control limits, were the data flagged '*' on Forms I and VI by the laboratory?

 yes no NA
- 4. Were raw data correctly transcribed onto Form VI?

 yes X no
- * Other Considerations:
- Field blanks cannot be used for duplicate analyses
- Duplicates must be analyzed for each analytical method

Comments: All requirements met.

- VII. Laboratory Control Sample (LCS) Analysis (guideline pg. E-12, Form VII)
 - 1. Was an LCS analyzed for every sample delivery group or batch of samples, whichever was more frequent?

 yes X no
 - 2. Were recoveries within the 80-120% limit?

 yes X no

-if the recoveries were outside this range the analysis must be terminated, the problem corrected and the previous samples associated with that LCS redigested and reanalyzed.

3. Were the raw data correctly transcribed onto Form VII? yes no X

Comments: Form VII was not included in the data package, however, the LCS was analyzed and met contract requirements, therefore, no action is taken.

VIII. Purnace Atomic Absorption (AA) QC Analysis (guidelines pg. E-14, Form VIII)

1. Does the raw data package contain absorbance values for two injections per sample, the average values and the relative standard deviation (RSD)?

yes

no

2. For analyte concentrations > the CRDL, did the RSD for the duplicate injections agree within 20%? (if yes, go to question 3)

yes

no

 $RSD = \frac{SD}{M} \times 100$

SD = Standard Deviation of Duplicate Injections

M = Mean of Duplicate Injections

2a. Were samples that exceeded the 20% criteria reanalyzed? yes no

2b. Did any reanalyzed samples exceed the 20% criteria? yes no

2c. If yes, did the laboratory flag the data of Form I with an 'M'?

yes no

3. Was the recovery of the spike > 40%? (if yes, go to question 4).

yes no

If no, was the sample diluted and rerun with another spike?

yes

no

4. Was sample absorbance 50% of spike absorbance?* (if yes, go to question 5).

yes no

* Spike absorbance = absorbance of spiked sample - absorbance of sample.

4a. For spike recoveries between 85 and 115%, were results reported to the IDL?

yes

no

 $RPD = \frac{(SSR - SR)}{SA} \times 100$

SSR = Spike Sample Recovery

SR = Sample Result
SA = Spike Added

- 4b. For spike recoveries outside the 85 and 115% range, were results reported to the IDL and flagged with 'W'?

 yes no
- 5. Was spike recovery between 85 and 115%? (if no, go to question 6)
 - 5a. Were results quantified from calibration curve and reported to IDL?

yes

no

6. Was an MSA at 50, 100 and 150% of the sample absorbance analyzed?

yes no

- 6a. Was each MSA analysis identified in the raw data along with the slope, intercept and correlation coefficient? yes no
- 6b. Were these data correctly transcribed onto Form VIII?

 yes no
- 6d. If no, were MSAs run once more?

 yes no
- If the correlation coefficients were still > 0.995, data on Form I must be from the run with the best 'r' and the data on Forms I and VII must be flagged with a '+'.

Were these criteria met?

yes

no

6e. Were all MSA obtained data marked with an 'S' or an S+-on form I?

.

no

Comments: Not required.

- IX. ICP Serial Dilution (L) Analysis (guidelines pg. E-12, Form IX)
 - 1. Was an ICP serial dilution performed on each group of samples of a similar matrix (i.e., soil, water) and concentration (i.e., low, high) or for each sample delivery group, whichever was more frequent?

yes no

2. For elements with concentrations >10% the CRDL, did any exceed the serial dilution results by more than 10%? (if no, skip questions 3 and 4)

yes no

% difference = $\frac{I - S}{I}$ X 100

I = Initial Sample Result

- S = Serial Dilution Result (instrument reading X5)
- 3. Which elements had concentrations that exceeded the 10% criteria?
- 4. Did the laboratory flag these data with an 'E' on Form IX?

 yes

 no
- 5. Were the raw data correctly transcribed onto Form IX?

 yes

 no

Comments: Not required.

- X. Instrument Detection Limits (IDL) (guidelines pg. E-13, Form XI)
 - 1. Were IDLs reported for each analyzed element?

 yes X no
 - 2. Were IDLs reported for each instrument used?

 yes X

 no
 - 3. Did the IDLs meet the contract requirements? (refer to pg. E-13, SOW 787)

 yes X no

Comments: All requirements met.

- XI. Interelement Corrections for ICP (guidelines pg. E-13, Form XII)
 - 1. Were correction factors reported on Form XII?

 yes X no

Comments: All requirements met.

- XII. Linear Range Analysis (LRA) (guidelines pg. E-14, Form XII)
 - Was a linear range verification standard analyzed? yes X no
 - 2. Was the results within ±5% of the true value? yes no

Holding Times -

Limits: Metals - 6 months; Hg - 30 days; Cn - 28 days.

- 1. Verified date of sample receipt by laboratory 7-21-89
- 2. Date of preparation/analyses 8-3-89
- 3. Were holding times met? yes X no

Analyte	Matrix	Date Sampled	Prep Date	Holding Time	Holding Time Limit/Met
Mercury	Low Vater	r 7-18-89	8-3-89	16 days	30 days yes

U.S. EPA - CLP

. Lab Name: KEYSTONE	INORGAN: ENVIRONMENTAL	1 IC ANALYSIS DATA Contract:		EPA SAMPLE NO.
Lab Code: KEYTX	Case No.:	12334 SAS No.	.:	SDG No.: MHP520
Matrix (soil/water)	: WATER		Lab Sample	ID: 890774002
Level (low/med):	LOW		Date Recei	ved: 07/21/89
% -Solids:	0			
Concen	tration Units	s (ug/L or mg/kg	dry weight)	: UG/L

: CAS No.	: : Analyte	¦ Concentration	; ; C;	Q	i i M
!		<u> </u>	!-!		-
	(Aluminum_				INR
	Antimony_		1 1		INR
	Arsenic				INR
	Barium				INR
17440-41-7	:Beryllium	•			INR
	Cadmium		; ;		! NR
: 7 440-70-2	Calcium	1	: :		! NR
7440-47-3	Chromium_	:	; ;		INR
7440-48-4	{Cobalt	{	: ;		INR
17440-50-8	Copper	•	1 1		INR
17439-89-6	:Iron	! !	; ;		INR
17439-92-1	!Lead	ł 1	1 1		INR
17439-95-4	Magnesium		: :		INR
7439-96-5	Manganese	·	; ;		INR
7439~97-6	!Mercury	. 0.20	; U :		! CV
17439-02-0	Nickel	!	1 1		INR
17440-09-7	:Potassium	¦	: :		! NR
7782-49-2	Selenium_		; ;		: NR
7440-22-4	Silver	!	: ;		INR
	Sodium		: :		INR
	Thallium_	!	1 1		INR
	:Vanadium_		; ;		INR
17440-66-6		!	: :		INR
!	!Cvanide	!	! !		INR

Color	Before:	Clarity Before:	Texture:
Color	After:	Clarity After:	Artifacts:
Commer			

(100007)

U.S. EPA - CLP

		U. 5.	EFA - CEP		
	EVETONE ENUIS		1 ANALYSIS DATA S Contract: 6		EPA SAMPLE NO.
ran Hames V	E1910ME EMATE	MINITED I ME	Contract: c	6-wa-000	· · · · · · · · · · · · · · · · · · ·
Lab Code:	KEYTX Ca	se No.: 123	34 SAS No.:		SDG No.: MHP520
Matrix (soi	l/water): WA7	ER		Lab Samp	le ID: 890774005
Level (low/	med): LOW	1		Date Rec	eived: 07/21/89
%.Solids:	0				
	CAS No.	 Analyte 	Concentration		M
	17440-36-0 17440-38-2 17440-39-3 17440-41-7 17440-43-9 17440-70-2 17440-47-3	Arsenic Barium Seryllium Cadmium Calcium Chromium_		! !	INR INR INR INR
	17440-48-4 17440-50-8 17439-89-6 17439-92-1 17439-96-5	Copper Iron Lead Magnesium Manganese			NR
	17439-02-0 17440-09-7 17782-49-2 17440-22-4 17440-23-5 17440-28-0 17440-62-2	Nickel; Potassium Selenium_; Silver; Sodium; Thallium_;			INR I
	7440-66-6 	Zinc Cyanide			INR : INR :
Color Before	:	Clarity	Before:		Texture:
Color After:		Clarity	After:		Artifacts:
Comments:					

000008

---:

U.S. EPA - CLP

•			1		EPA SAMPLE NO.
		INURGANIC /	ANALYSIS DATA	onee i	MHP522
Lab Name: KEY	STONE ENVIR	DNMENTAL	Contract:	68-W8-00 05	
Lab Code: KE	EYTX Cas	se No.: 123	334 SAS No.	:	SDG No.: MHP520
Matrix (soil/	water): WAT	ER		Lab Sampl	e ID: 890774006
Level (low/me	ed): LOW			Date Rece	ived: 07/21/89
% Solids:	0				
	Concentration	on Units (ug/L or mg/kg	dry weight): UG/L
		·			
	CAS No.		; Concentration 	(i i i i i i i i i i i i i i i i i i i
	17429-90-5	:Aluminum	;	-	INR
	17440-36-0	Antimony_	# *	1 1	INR
	17440-38-2	Arsenic	!	1 1	INR I
	17440-39-3				
	17440-41-7			: :	
	17440-43-9				INR INR
	17440-70-2 17440-47-3				INR I
		_			INR I
	:7440-48-4 :7440-50-8				INR I
	17439-89-6	:Iron	! !		INR I
	17439-92-1			ii	INR I
	17439-95-4				INR :
	17439-96-5			1 1	INR
	17439-97-6	-		: U :	ICV
	17439-02-0				INR :
	17440-09-7				INR I
	17782-49-2			•	INR :
	17440-22-4			• •	INR I
	17440-23-5			• •	INR NR
	17440-28-0 17440-62-2			•	INR I
	17440-66-6				INR
	1	!Cvanide	•		INR
			! 		11
Color Before:		Clarity	y Before:		Texture:
Color After:		Clarity	y After:	•	Artifacts:
Comments:					

000009

		u.s.	EPA - CLP		•
•		INDREANTE A	1 ANÁLYSIS DATÁ		EPA SAMPLE NO.
			THE LOTE DATE	O	MHP523
Lab Name: KE	YSTONE ENVIR	ONMENTAL	Contract:	68-W8-0005	
Lab Code: Ki	EYTX Ca	se No.: 12:	334 SAS No.		SDG No.: MHP520
Matrix (soil	/water): WAT	ER		Lab Sample	₽ ID: 890774007
Level (low/me	ed): LOW			Date Rece	ived: 07/21/89
% Solids:	o				
	C	11_2 &_ 2.			5 a 120 21
	Concentrati	on ourts (ug/L or mg/kg	ary weight	7: 007L
			Concentration		
	7429-90-5	! Aluminum	! 	_	INR
	17440-36-0	!Antimony	! !	!!	!NR !
	17440-38-2	!Arsenic	, !	ii	INR I
	17440-39-3	!Barium	! !		INR !
	17440-39-3 17440-41-7	!Bervllium	!		
	17440-43-9				
	17440-70-2				
	17440-47-3				INR I
	17440-48-4				INR I
	17440-50-8				INR I
	17439-89-6	.cobbe	1 }		INR I
	17439-92-1	111011	1 }		INR I
	17439-95-4				!NR !
	17439-96-5				INR !
	17439-97-6	!Mercury	0.20	!!!!	והעינ
	17439-02-0	!Nickel	1	1 1	NR !
	17440-09-7				!NR !
	17782-49-2			i	INR I
	17440-22-4				INR
	17440-23-5				INR I
	17440-28-0				INR I
	17440-62-2				INR I
	17440-66-6			•	INR I
					INR I
		1	; ! [!]		11
Color Before:			y Before:		Texture:
Color After:		Clarity	y After:		Artifacts:
Comments:					

(100010 ecology and environment /87

U.S. EPA - CLP

				B 44 BB 444		1	O1		_	SAMPLE	
				INORGANI	C ANA	LYSIS DATA	SHE	EŦ	•	MHP524	
Lab Na	ame: KE	YSTONE	ENVIR	ONMENTAL		Contract:	68-	2000-BW			
Lab Co	ode: Ki	EYTX	Ca	se No.:	12334	SAS No.	•		SDG	No.: Mh	1P520
Matr:	ix (soil	/water)	: WAT	ER			La	b Sampl	e ID:	890774	1008
Level	1 (10w/m	ed):	LOW				Da	te Rece.	ived:	07/21/	′8 9
% Sol	lids:		0								
		Concer	ntrati	on Units	(ug/	L or mg/kg	dry	weight): UG	/L	
									<u>-</u>		
		CAS	No.	: Analyt	e ¦Ca	ncentration	ic	. Q	M		
		·		i	;		-!-	i	''		
		17429	-90-5	Aluminu	m_		i		INR I		
		17440-	-36-0	Antimon Arsenic Barium_	Y_!			! !			
		17440-	-38-2	Arsenic	!			i !	i MAN		
		:7440-	-39-3	Barium_	!		i	i •	INC I		
		7440	-41-7	Berylli	um i		i	:			
				(Cadmium			i		INR I		
				Calcium			i	t i t	INR I		
				Chromiu			i	i -	י אויו		
				Cobalt_			•	1 1	INC I		
				Copper_			1	: :	IND		
		17433*	-83-6	:Iron	¦			· }			
		174331	-92-1 OF 4	Lead Magnesi	i		,	4 1	IND !		
		17420	-95 -F	:Magnesi	um i			! !	INR !		
		17400	-30-J -37 <i>-2</i>	Mangane	> E ;	11.50	•	! !	ICV I		
		17433	-02-0	'Nickel_	;		į	!	NR !		
				Potassi			į	!	NR :	•	
				Seleniu				!			
				Silver_				· {			
		17440-	-23-5	Sodium_	;		i		INR I		
				Thalliu			ļ.	:	INR I		
				!Vanadiu			;	1	INR I		
		17440-	-66-6	Zinc	-		- 1	!	INR :		
				Cyanide			ł	:	INR I		
		!		1	'		_!_	!	!!		
Color	Before:			Clar	ity E	lefore:		•	Textu	re:	
Color	After:			Clar	ity A	fter:		•	Artif	acts:	
Commer	nts:										
											-

000011

U.S. EPA - CLP

	INGREANTE ANALY	1 ANIC ANALYSIS DATA SHEET		
Lab Name: KEYSTONE E		ntract: 68-W8-0005	MHP525	
Lab Code: KEYTX	Case No.: 12334	SAS No.:	SDG No.: MHP520	
Matrix (soil/water):	WATER	Lab Sampl	e ID: 890774009	
Level (low/med):	LOW	Date Rece	eived: 07/21/89	
% Solids:	0			

Concentration Units (ug/L or mg/kg dry weight): UG/L

: :CAS No.	1 Applyto	 Concentration	1 1		
icas No.	i wilathra	; ; Coucellor a ctoll	! !	u	; M ;
7429-90-5	'Aluminum_	' !	<u> </u>		NR
17440-36-0	_				INR :
	'Arsenic		1		INR I
	Barium		: :		INR I
17440-41-7			1 1	•	INR :
17440-43-9	Cadmium	!	1 1		INR :
17440-70-2	Calcium		1 1		INR :
1 7440-47- 3	:Chromium_		: :		INR :
17440-48-4			: ;		INR I
:7440-50-B	Copper	!	: :		INR :
17439-89-6	!Iron	!	: :		INR I
7439-92-1			1 - 1		INR :
17439-95-4			! !		INR I
	Manganese		1 1		INR :
	Mercury		U		CV :
17439-02-0			: :		INR I
17440-09-7			1 1		INR I
	Selenium_				INR I
17440-22-4					INR :
	Sodium				INR :
	Thallium_		!		INR I
	!Vanadium_				INR :
17440-66-6			. ! 		INR !
ļ	Cyanide		i !		INR :
i	. ' '		i_;.		_ ' '

Color	Before:	Clarity	Before:	Texture:
Color	After:	Clarity	After:	Artifacts:
Commer	nts:			
				2 10000

		0.5.	ELU - API.		
Lab Name: k	EVSTONE ENVIS		1 ANALYSIS DATA : Contract: (EPA SAMPLE NO.
-			301101 4401		*
Lab Code:	KEYTX Ca	se No.: 12:	334 SAS No.	*	SDG No.: MHP520
Matrix (soi	1/water): WAT	ER		Lab Samp	le ID: 890774010
Level (low/	med): LOW	l		Date Rece	eived: 07/21/ 89
% Solids:	0				
	-				
	Concentrati	on Units (ug/L or mg/kg (dry weight	:): UG/L
					-
	i !CAS No	! Analyta	: Concentration		
	!				<u> </u>
	7429-90-5			-	INR
	17440-36-0	Antimony	1 1	1 1	INR !
	17440-38-2	:Arsenic		; ;	INR I
	17440-39-3	!Barium	!	1 1	INR I
	7440-41-7	Beryllium	1		INR 1
	17440-43-9	Cadmium	} !	1 1	INR I
	17440-70-2				:NR :
	17440-47-3	Chromium	 		INR :
	17440-48-4			1 1	INR I
	17440-50-8				INR I
	17439-89-6	Iron			INR I
	17439-92-1	Lead	,		INR :
	17439-95-4			1 1	INR I
					INR I
	17439-97-6	Mercury	. 0.20	: U !	
	:7439-02-0	!Nickel		1 1	INR I
	17440-09-7			: :	INR I
	17782-49-2	Selenium_	}	1 1	INR :
	17440-22-4			: :	INR I
	17440-23-5			1 1	INR :
	17440-28-0			1 1	INR !
	17440-62-2			1 1	INR I
	1 744 0 <i>-</i> 66 <i>-</i> 6	!Zinc	•	: :	INR I
	1			1 1	INR I
		1		_!_!	.11
Color Before	:	Clarity	/ Before:		Texture:
Color After:		Clarity	/ After:		Artifacts:
Comments:					

		u.s.	EPA - CLP		•
		INDRGANIC A	1 NALYSIS DATA S		EPA SAMPLE NO.
lah Name: KE	YSTONE ENUIR		Contract: 6		MHP527
	.010.12 2.111		CONTRACT.	na 000c	
Lab Code: KI	EYTX Ca	se No.: 123	34 SAS No.:		SDG No.: MHP520
Matrix (soil.	/water): WAT	ER		Lab Sample	⊒ ID: 890774011
Level (low/me	ed): LOW	ı		Date Rece	ived: 07/21/89
% Solids:	0				
%. 5011 05 :	U				
	Concentrati	on Units (u	ig/L or mg/kg d	iry weight:): UG/L
			· • • • • • • • • • • • • • • • • • • •		
	ICAS No.	: Analyte :	Concentration	1 1	i i ! M !
	!	11		. _	
	17429-90-5	Aluminum_			INR I
	:7440-36- 0	Antimony_;		1 1	INR :
	17440-38-2	Arsenic		1 1	! NP !
	17440-39-3			1 1	INR I
	7440 -41 - 7	Beryllium		1 1	INR I
	17440-43-9			1 1	
	1 7440- 70-2			1-1	INR
	17440-47-3				INR
	7440-48- 4	Cobalt			INR
	17440-50-8	Copper:			INR I
	17439-89-6	Iron		1 1	INR : INR :
	17439-92-1	Lead		; ;	INR :
	17439-95-4			: :	INR I
	17439-96-5			1, 1	INR I
	17439-97-6				
	17439-02-0			; ;	
	17440-09-7			1 1	
	17782-49-2				INR I
	17440-22-4				INR I
	17440-23-5				INR !
	17440-28-0				INR !
	17440-62-2				INR I
	17440-66-6				INR !
	·	Cyanide	and the second		NR
	·	' '		. ' _ '	
Color Before:		Clarity	Before:	ר	Texture:
Color After:		Clarity	After:	4	Artifacts:
Comments:					

U.S. EPA - CLP

INORGANIC ANALYSIS DATA SHEET MHP528 MHP528 Lab Name: KEYSTONE ENVIRONMENTAL Contract: 68-W8-0005						
Lab Name: KEYSTONE ENVIRONMENTAL Contract: S8-W8-0005 MHP528 Lab Code: KEYTX			INORGANIC A	_	SHEET	EPA SAMPLE NO.
Lab Code: KEYTX Case No.: 12334 SAS No.: SDG No.: MHP520						
Matrix (soil/water): WATER Level (low/med): LOW Concentration Units (ug/L or mg/kg dry weight): UG/L CAS No. Analyte Concentration C Q M	Lab Name: k	EYSTONE ENVIR	ONMENTAL	Contract:	68-W8-0005	
Level (low/med): LDW Date Received: 07/21/89	Lab Code:	KEYTX Ca	se No.: 12:	334 SAS No.	:	SDG No.: MHP520
Concentration Units (ug/L or mg/kg dry weight): UG/L CAS No. Analyte Concentration C Q M	Matrix (soi	.l/water): WAT	ER		Lab Sampl	e ID: 890774012
Concentration Units (ug/L or mg/kg dry weight): UG/L	Level (low/	med): LOW			Date Rece	ived: 07/21/89
Concentration Units (ug/L or mg/kg dry weight): UG/L						
CAS No. Analyte Concentration C Q M	% Solids:	. 0				
CAS No. Analyte Concentration C Q M		Concentrati	on Units (ua/L or ma/ka	drv weight): UG/L
CAS No. Analyte Concentration C. U M		Concessor avi	O() O() (
CAS No. Analyte Concentration C. U M		;	1			
7449-90-5 Aluminum		CAS No.	: Analyte	Concentration 	ici a	i M i
		; ! 7400_00_5	i		-	'' !NR !
17440-41-7 Beryllium		!7429-30-3 !7440-36-0	!Antimony) 		
17440-41-7 Beryllium		17440-38-2	:Arsenic	, 	ĺ	INR I
17440-41-7 Beryllium		17440-39-3	Barium	 	-	INR !
		17440-41-7	Beryllium	1	1 1	INR
7440-70-2 Calcium_						INR !
7440-50-8 Copper		17440-70-2	Calcium	† 1	1 1	!NR :
7440-50-8 Copper		1 74 40-47-3	Chromium_	<u> </u>	1 1	INR
7440-50-8 Copper		17440-48-4	:Cobalt	1	1 1	INR I
17439-92-1 Lead					-	INR !
17439-97-6 Mercury 0.20 U		17439-89-6	:Iron	•	1 1	INR I
17439-97-6 Mercury 0.20 U		17439-92-1	:Lead			INR I
17439-97-6 Mercury 0.20 U		17439-95-4	:Magnesium	•		INR I
7440-09-7		1/433-96-5	:manganese	i	i i	INK I
7440-09-7		17439-97-6	Mercury	. 0.20	101	INP !
17782-49-2 Selenium					• • • •	!NR !
7440-22-4 Silver						
17440-23-5 Sodium		17440-22-4	!Silver	† 	ii	
17440-28-0 Thallium		17440-23-5	Sodium			
17440-62-2 Vanadium					1 1	INR I
7440-66-6 Zinc					1 1	INR I
Color After: Cyanide					1 1	INR I
Color Before: Clarity Before: Texture: Color After: Clarity After: Artifacts:		1	Cyanide			
Color After: Clarity After: Artifacts:			1	·	_!_!	!!
	Color Before	•=	Clarity Before:			
Comments:	Color After:		Clarity	y After:		Artifacts:
	Comments:					

000015

Keystone 12334-8-5

U.S. EPA - CLP

•	1 INORGANIC ANALYSIS DATA :	EPA SAMPLE NO.
Lab Name: KEYSTONE E		MHP529 68-W8-0005
Lab Code: KEYTX	Case No.: 12334 SAS No.	: SDG No.: MHP520
Matrix (soil/water):	WATER	Lab Sample ID: 890774013
Level (low/med):	LOW	Date Received: 07/21/89
% Solids:	٥	

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	 Analyte	: Concentration	10		: : M	1
1	}	!	1_1		!	1
17429-90-5	Aluminum_		-		INR	٠,
17440-36-0	Antimony_		1		! NR	ł
17440-38-2	Arsenic		1	!	INR	1
17440-39-3	Barium	!	; ;		INR	1
17440-41-7	Beryllium		1 1		! NR	:
17440-43-9	Cadmium	;	1 1		! NR	;
17440-70-2			: :		INR	!
17440-47-3			1 1		INR	ł
17440-48-4			1 - 1		! NR	1
:7440-50-B	:Copper	}	; ;		INR	i
	!Iron		; ;		: NR	1
	:Lead		! :		INR	1
	Magnesium		: :		INR	1
	Manganese		1		INR	1
17439-97-6			:0:		ICV	i
17439-02-0			! !		INR	!
17440-09-7			1 1		INR	1
17782-49-2			: :		INR	1
17440-22-4			; ;		INR	ł
17440-23-5			1		INR	1
17440-28-0			; ;		INR	;
17440-62-2		,	: :		NR	1
17440-66-6	Zinc		1 1		NR	- [
!	Cyanide		1 1		INR	1
	<i>!</i>		! _!		!	. !

Color	Before:	Clarity	Before:	Texture:
Color	After:	Clarity	After:	Artifacts:
Commer	nts:			

000016

		u.s.	EFA - CLF		
•		INORGANIC A	1 Analysis data	SHEET	EPA SAMPLE NO.
					: MHP530
Lab Name:	KEYSTONE ENVIR	ONMENTAL	Contract:	98-M8-0002	
Lab Code:	KEYTX Ca	se No.: 123	334 SAS No.	:	SDG No.: MHP520
Matrix (so	oil/water): WAT	ER		Lab Sample	e ID: 890774014
Level (low	v/med): LOW			Date Rece	ived: 07/21/89
% Solids:	0				
			ug/L or mg/kg): UG/L
	:		 		
	CAS No.	: Analyte	Concentration 	ici q	M
	17429-90-5				INR
	17440-36-0				INR I
	17440-38-2				INR I
	17440-39-3				INR I
	17440-41-7	•			INR I
	17440-43-9				INR I
	17440-70-2				INR I
	17440-47-3				INR I
	17440-48-4				INR I
	17440-50-8				INR I
	17439-89-6	iron) 		INR NR
	17439-92-1				INR I
	7439 -95 -4 7439 -96 -5			: :	INR I
	17439-97-6				ICV I
	17439-02-0				INR I
	17440-09-7				INR I
	17782-49-2				INR I
	17440-22-4				INR I
	17440-23-5	Sodium	- 		INR I
	17440-28-0			1 1	INR
	17440-62-2	:Vanadium_	1	1 1	INR I
	17440-66-6	:Zinc		: :	INR
		Cyanide	 		INR I
		·		_!_!	
Color Befor	e:	Clarity	/ Before:	-	Texture:
Color After		Clarity	After:	•	Artifacts:
Comments:					

U.S. EPA - CLP

Lab Name: KEYSTONE EN	INORGANIC ANALYSIS DATA S	MHP532
Lab Code: KEYTX	Case No.: 12334 SAS No.:	SDG No.: MHP520
Matrix (soil/water): Level (low/med):	WATER LOW	Lab Sample ID: 890774015 Date Received: 07/21/89
% Solids:	0	

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	 Analyte 	 Concentration 	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	Q	: : M	
17429-90-5	Aluminum_		-:		INR	١.
	Antimony_		!		INR	
17440-38-2					INR	į
17440-39-3					INR	!
17440-41-7			1		INR	Ì
17440-43-9	•			<u> </u>	INR	,
17440-70-2			!		INR	1
17440-47-3			1		INR	Ì
17440-48-4			:		INR	
17440-50-8					INR	1
17439-89-6					INR	1
17439-92-1		!	í		INR	1
17439-95-4			1		INR	;
17439-96-5			1		INR	:
17439-97-6	-		: U :		CV	;
17439-02-0			: :		INR	ł
17440-09-7	Potassium	 	; ;		INR	ţ
17782-49-2	:Selenium	1 1	: :		INR	;
17440-22-4	_	!	; ;		INR	;
17440-23-5	Sodium	! •	: :		INR	ļ
17440-28-0			; ;	}	INR	ŀ
17440-62-2			: :		INR	1
17440-66-6		!	: :	!	INR	ŀ
	Cyanide	;	: :	}	INR	1
1	1	<u>}</u>	1_1		1	. 1

Color	Before:	Clarity Before:	Texture:
Color	After:	Clarity After:	Artifacts:
Commer			
			·

.:

U.S. EPA - CLP

•	1	NORGANIC A	1 NALYSIS DATA S	SHEE	ΞT	!	SAMPLE MHP533	NO.
Lab Name: KEYST	ONE ENVIRO	INMENTAL	Contract: 6	4- B2	18-0005	!		
Lab Code: KEYT	X Cas	se No.: 123	334 SAS No.:	:		SDG N	o.: MHI	P520
Matrix (soil/wa	ter): WATE	ER		Lat	Sample	e ID:	8907740	016
Level (low/med)	: LOW			Dat	e Rece	ived:	07/21/8	39
% Solids:	. 0							
Col	ncentratio	on Units (ig/L or mg/kg o	dry	weight:): UG/	L	
			Concentration	C				
! 7·	429-90-5 :	Aluminum_		-		NR I		
¦ 7·	440-38-2 :	Antimony_ Arsenic Barium		; ;		NR I		
ł 7·	440-41-7	Beryllium	• •	1 1		NR :		
1 <i>7</i> ·	440-70-2	Cadmium; Calcium; Chromium_;		! !		NR I		
17.	440-48-4	Cobalt		; ;		NR I		
17	439-89-6 :	Iron		!!!		NR I		
17	439 <i>-</i> 95-4 :	Magnesium Manganese				NR I		
! <i>7</i> -	4 <mark>39-</mark> 97-6 ¦	Mercury Nickel	. 0.20	U		ICV INR		
17	440-09-7	Potassium: Selenium_				INR INR		
17·	440-23-5 :	Silver		1 1	•	NR I	•	
! <i>7</i> -	440-62-2	Thallium_{ Vanadium_{				NR :		
;	!	Zinc Cyanide		; ; ; ; ; _ ; _		NR NR 		
Color Before:	·		Before:		7	Γextur	e:	
Color After:		Clarity	After:		4	Artifa	cts:	
Comments:								
								<u>-</u>

INDRGANIC ANALYSIS DATA SHEET	•	Keystone DC# 12334-8-5				
INDRGANIC ANALYSIS DATA SHEET			u.s.	EPA - CLP		
Lab Name: KEYSTONE ENVIRONMENTAL Lab Code: KEYTX			INORGANIC A	7	SHEET	
Lab Code: KEYTX						
Matrix (soil/water): WATER Lab Sample ID: 890774017 Level (low/med): LOW Concentration Units (ug/L or mg/kg dry weight): UG/L CAS No. Analyte Concentration C G M	Lab Name: K	EYSTONE ENVIR	ONMENTAL	Contract:	6 8-W8- 000:	5
Z. Solids: 0 Concentration Units (ug/L or mg/kg dry weight): UG/L	Lab Code: k	CEYTX Ca	se No.: 12:	334 SAS No.	:	SDG No.: MHP520
Concentration Units (ug/L or mg/kg dry weight): UG/L CAS No. Analyte Concentration C Q M	Matrix (soi)	l/water): WAT	ER		Lab Samp	le ID: 890774017
Concentration Units (ug/L or mg/kg dry weight): UG/L	Level (low/m	ned): LOW			Date Rece	eived: 07/21/89
Concentration Units (ug/L or mg/kg dry weight): UG/L	% Solide:	0				
CAS No. Analyte Concentration C Q M	4. SUITUSI					
CAS No. Analyte Concentration C Q		Concentrati	on Units (ug/L or mg/kg	dry weight	t): UG/L
CAS No. Analyte Concentration C Q						
			•			1 1
7429-90-5 Aluminum		LAS NO.	: Analyte !	:Concentration !	: C: U:	i M i ! !
		7429-90-5	Aluminum	' !	-;-;	-
				!		
7440-39-3 Barium				!	; ;	INR :
		17440-39-3	Barium	i		INR :
		17440-41-7	Beryllium	!	1 1	INR I
		17440-43-9	Cadmium	!	1 1	INR
7440-48-4 Cobalt					1 1	
					1 1	INR
7439-89-6 Iron					1 1	INR :
7439-92-1 Lead		17440-50-8	:Copper	!		
17439-96-5 Manganese		17439-89-6	:Iron	;	1 1	
17439-96-5 Manganese				!	1 1	
17439-97-6 Mercury				i	i i	
17440-09-7 Potassium						
17440-09-7 Potassium				0.20	101	
7782-49-2 Selenium_						
		17/82-49-2	:seleuium_	i	ii	
7440-28-0 Thallium_		17440-22-4	ibilver	i 1	i i	
7440-62-2 Vanadium_						
					1 1	
					1 1	INR I

Color	Before:	Clarity	Before:	Texture:
Color	After:	Clarity	After:	Artifacts:
Commer	nts:	•		

INR I

U.S. EPA - CLP

•		INORGANIC A	1 Analysis Data :	SHEET	EPA SAMPLE NO.
		*			MHP535
Lab Name: KI	EYSTONE ENVIR	ONMENTAL	Contract: (68-W8-0005	
Lab Code:	ŒYTX Ca	se No.: 12	334 SAS No.	•	SDG No.: MHP520
Matrix (soi)	l/water): WAT	ER		Lab Sampl	e ID: 890774018
Level (low/	ned): LOW			Date Rece	ived: 07/21/89
% Solids:	. 0				
	Concentrati	on Units (ug/L or mg/kg (dry weight): UG/L
	!		 !		1 [
	CAS No.	Analyte	Concentration		
		1	 	_	1
	17429-90-5	Aluminum_	1	; ;	INR :
	17440-36-0	Antimony_		1 1	
	17440-38-2				INR !
	17440-39-3				INR
	17440-41-7			1 1	INR I
	17440-43-9				INR I
	17440-70-2			1 1	
•	17440-47-3			1 1	
	17440-48-4			1 1	
	17440-50-8	Copper	!		INR I
	17439-89-6	!Iron	1		INR I
	:7439-92-1	[Lead	1		INR I
	17439-95-4	!Magnesium	 	; ;	INR
	17439-96-5			1 1	INR
	1 7439-97- 6				
	17439-02-0			; ;	
	17440-09-7			1 1	
	17782-49-2				INR
	17440-22-4	Silver	;		INR !
	17440-23-5	Sodium	!		INR I
	17440-28-0				INR !
	17440-62-2				INR I
	17440-66-6				INR I
	<u> </u>	Cyanide	1 1	; ;	INR !
	i			_	·
Color Before:	1	Clarity	y Before:		Texture:
Color After:		Clarity	y After:		Artifacts:
Comments:					

000021

		u.s.	EPA - CLP		
Lab Name: KI			1 ANALYSIS DATA S Contract: 6	SHEET	MHP537
Lab Code:	KEYTX Ca	se No.: 123	334 SAS No.:	}	SDG No.: MHP520
Matrix (soi)	l/water): WAT	ER		Lab Sampl	e ID: 890774019
Level (low/	med): LOW			Date Rece	ived: 07/21/ 89
% Solids:	0				
	Comembesti	am Umita (طاط والمساور المساور	3 - 110 / I
	Concentrati	on units (≀g/L or mg/kg c	iry weight): UG/L
					1 1
	CAS No.	: Analyte :	Concentration 	10: Q	i M
	! 7429-90-5	! Aluminum	<u>'</u>		INR :
	17440-36-0 17440-38-2 17440-39-3	Antimony	}		INR !
	17440-38-2	Arsenic		1 1	INR
	17440-39-3	Barium		ii	INR I
	17440-41-7	Bervllium	*.	1 1	INR !
	17440-43-9			ii	INR I
	17440-70-2				INR I
	17440-47-3				INR I
	17440-48-4			1 1	!NR !
	17440-50-8				INP !
	17439-89-6			· ·	! N.P. !
	!7439 -92 -1	!! ead		· ·	!NP !
	7439-92-1 7439-95-4	!Magnesium!	•		IND !
	17439 -96 -5			· ·	!NP !
	17439-97-6			1111	icv i
	17439-02-0		!		INR I
	17440-09-7			1 1	
	17782-49-2			1 1	! NID
	17440-22-4			1 1	IND I
	17440-23-5				
					INR I
	17440-28-0 17440-62-2				INR I
	17440-62-2	:vanaoium_:	i !		INR I
	17440-66-6		i !		INR I
	¦	Cyanide	1 1	1 1	INR
	'	'		-'-'	''
Color Before:	:	Clarity	/ Before:	•	Texture:

COLO	Delore:	Clailty	pelole:	iextale.
Color	After:	Clarity	After:	Artifacts:
Commer	nts:			
	* ** ** ** ** ** ** **			
				<u> </u>

000022

£

U.S. EPA - CLP

					
			1		EPA SAMPLE NO.
		INORGANIC	ANALYSIS DATA :	SHEET	
1 -t- 11		MARKET 17 A I		50 WO 00	: MHP538
Lao Name:	KEARIONE ENAIK	UNMENIAL	Contract: (58 -W8 -OO	05
Lab Code:	KEYTX Ca	se No.: 12	334 SAS No.	:	SDG No.: MHP520
Matrix (so:	il/water): WAT	ER		Lab Sam	ple ID: 890774020
Level (low	/med): LOW			Date Re	ceived: 07/21/89
% Solids:	. 0				
	·				
	Concentrati	on Units (ug/L or mg/kg (dry weig	ht): UG/L
	CAS No.	: Analyte	:Concentration	ici a	! M !
	! 7429-90-5	! Aluminum	!	-	:NR
	17429-90-5 17440-36-0 17440-38-2 17440-39-3	Antimony	, 		INR I
	17440-38-2	Arsenic			INR I
	17440-39-3	Barium	!	11	INR I
	17440-41-7	Beryllium	;	1 1 1	INR
	17440-43-9	Cadmium	:	1 1	INR
	17440-70-2			1 1	INR I
	:7440-47-3			; ; ; ;	INR I
	17440-48-4			1 1	INR I
	17440-50-8	Copper	;	1 1	INR :
	17400 DO -0	17	•	1 1	INR
	17439-92-1	!Lead	•	: :	INR I
	17439-95-4	:Magnesium	!		INR
	17439-96-5	!Manganese	;	i i	ink i
	17439-97-6	!Mercury	0.20	U	ICV I
	17439-02-0	Nickel	;	1 1	inr i
	17440-09-7	Potassium	!		INR I
	17782-49-2			: :	INR
	17440-22-4	Silver	1	; ;	INR I
	17440-23-5			: :	INR I
	17440-28-0			1 1	INR I
	17440-62-2			1 1	INR I
	17440-66-6			1 1	INR I
	[[Cyanide	•		(NR)
			[!]	_	!!
Color Before	: :	Clarit	y Before:		Texture:
Color After:	•	Clarity	y After:		Artifacts:
Comments:					

000023

	0005 MHP539
Lab Name: KEYSTONE ENVIRONMENTAL Contract: 68-W8-Cab Code: KEYTX Case No.: 12334 SAS No.: Matrix (soil/water): WATER Lab Sate Code: Low/med): LOW Date	SDG No.: MHP520
Lab Code: KEYTX Case No.: 12334 SAS No.: Matrix (soil/water): WATER Lab S Level (low/med): LOW Date	SDG No.: MHP520
Matrix (soil/water): WATER Lab S Level (low/med): LOW Date	ample ID: 890774021
Level (low/med): LOW Date	
	Received: 07/21/89
% Solids: 0	
••	
Concentration Units (ug/L or mg/kg dry we	1 1
	NR
7440-66-6 Zinc	INR I
Cyanide	!NR
Color Before: Clarity Before:	Texture:
Color After: Clarity After:	Artifacts:
Comments:	

U.S. EPA - CLP

•				INORGANIC	: ANAI	1 LYSIS DATA	SHE	ET			
Lab Na	me: KEY	STONE I	ENVIR	DNMENTAL	. (Contract:	68-	M8-000	5	MHP5 	40
Lab Co	de: K	YTX	Ca	se No.: 1	2334	SAS No	. :		SDG	No.:	MHP520
Matri	x (soil/	(water)	WAT	ER			La	b Samp	le ID	8907	74022
Level	(low/me	ed):	LOW				Da	te Rec	eived:	07/2	1/89
% Sol	ids:	•	0								
					_	L or mg/kg					
								·		-	
		CAS N	э.	 Analyte	Co	ncentratio	n C	Q	M	i :	
		; ;7429-	 -0-5	: :Aluminum	<u> </u>		-		NR	; ;	
		17440-1	36 -O	!Antimony	'-		į				
		17440-1	20 - 7 20 - 7	Antimony Arsenic	-;			Ì			
		17440-0	30-2 30-7	Barium	· - ¦						
		! 7440 = ·	11 - 7	Berylliu	! .an.!		,		: NR		
		17440-	71.	:Cadmium_	1		į		INR		
				:Caumium_ :Calcium_			1	1	INR		
				:Carcram_ :Chromium			1	:	INR		
							;	1	1 1417	! !	
		17440-	+0 -4 =00	Cobalt	· - ¦			1			
		17440-0	70 /	Copper	· - ¦			1 			
				!Iron				1			
				Lead			i	i	1 1/17	1 1	
				Magnesiu			i	!	INE) !	
				Manganes		0.00	111	i •	INR		
		17439-1	#/-b	!Mercury_	· [. 0.20	10	} }	100	; !	
				Nickel			i	; }	1 1417	;	
				Potassiu				·			
				(Selenium				1 			
		17440 17440-:	2274 22.5	Silver Sodium			1		INR		
				:5001um :Thallium			i	1	INR		
				: mailium !Vanadium			;	,	INR		
				: Zinc				•	INR		
				:Zinc :Cyanide_			;	<u>'</u>	INR	_	
		'			¦		;_		_ !	;	
Color	Before:			Clari	ty B	efore:			Text	ure:	
Color	After:			Clari	ty A	fter:			Arti	facts:	•
Commer	its:								• د د د د د د د د		

000025

recycled paper recycled paper ecology and environment ecology and environment

REGION VIII SUMMARY OF DATA QUALITY ASSURANCE REVIEW

guideline references are from Contract #787

Case No.: SAS 4725H TDD No.: F08-8909-08

Site: Richardson Flats

Contractor Laboratory: Silver Valley Labs

Data Reviewer: Annette Sackman Date of Review: 9-15-89

Sample Matrix: 14 Low Soils

Analysis: Metals plus Mercury

Sample Nos.: 4725H01, 4725H02, 4725H03, 4725H04, 4725H05, 4725H06, 4725H07, 4725H08, 4725H09, 4725H10, 4725H11, 4725H12, 4725H13, 4725H14

- () Data are acceptable for use.
- (X) Data are acceptable for use with qualifications noted.
- () Data are preliminary pending verification.
- () Data are unacceptable.

Action required by DPO?

No X Yes The following items require action:

Action required by project officer?

No X Yes

The following are our findings:

All calibration and blank contract compliances were met except that for the last half of the thallium analysis the ICV, ICB, CCV and CCB was not recorded on forms IIA and III.

The CRDL standards were run only at the beginning of the furnace AA analysis and not at the end. No qualifications have been prescribed for this discrepancy so no flags are assigned.

Spike recoveries were low for antimony (52.9%) and thallium (48.7%) and indicate positive values for these elements are biased low and flagged "J", estimated. Undetected values indicate antimony and thallium may or may not be present due to elevated detection limits; therefore, these values are flagged "UJ", estimated. Selenium spike recoveries were very low (-33.1%) and indicate these values are severely biased low. Positive values confirm the presence of the element but are flagged "J" and estimated low. Undetected values do not indicate the nonexistence of the element and are unusable and flagged "R", rejected.

For the MSA analysis for thallium, no raw data was presented for duplicate injections. One of the correlation coefficients was below 0.995 for samples 4725H02, 4725H06, 4725H09 and 4725H11; therefore, thallium values for these samples are flagged "J", estimated. For sample 4725H03, both correlation coefficients were below 0.995; therefore, the thallium value for this sample is unusable and flagged "R", rejected.

For the MSA analysis for selenium, both correlation coefficients were below 0.995 for samples 4725H01, 4725H04, 4725H05 and 4725H08; therefore, values for these samples are unusable and flagged "R", rejected.

The percent difference was high for the serial dilution for cadmium (14.5%); therefore these values are flagged "J", estimated.

Lead was analyzed by ICAP due to high sample concentrations, therefore the CRDL of $5\mu g/l$ was not met but is waived under these unusual conditions.

Inorganic Data Completeness Checklist

- X Inorganic analysis data (Form I)
- X Initial calibration and continuing calibration verification (Form IIA)
- X CRDL standard for AA and ICP (Form IIB)
- X Blanks (Form III)
- X ICP interference Check sample (Form IV)
- X Spike sample recovery (Form VA)
- X Post digestion spike sample recovery (Form VB)
- X Duplicates (Form VI)
- X Laboratory control sample (Form VII)
- X Standard addition results (Form VIII)
- X ICP serial dilutions (Form IX)
- X Holding times (Form X)
- X Instrument detection limits-quarterly (Form XI)
- X ICP interelement correction factors-quarterly (Form II)
- X ICP linear ranges-quarterly (Form XIII)
- X Raw data for interference checks
- X Raw data for calibration standards
- X Raw data for blanks
- X Raw data for CRI and/or CRA
- X Raw data for samples
- X Raw data for duplicates
- X Raw data for spikes
- X Traffic reports

Contract Compliance

- I. Initial and Continuing Calibration Verification (ICV and CCV) (guidelines pg. E-4, Form IIA)
 - Was instrument calibrated daily and each time it was set up? yes X no
 - 2. Were instruments calibrated using 1 blank and several standards?

 yes X no
 - 3. Were calibration verifications within 90-110%? yes X no
 - 4. Were continuing calibrations run at 10% frequency?

 yes X no
- 5. Were the raw data correctly transcribed onto Form IIA?

 yes no X

 Comments: For thallium, one-half of the CCV's were not recorded on Forms IIA. All other requirements were met.
- II. CRDL Standards for ICP (CRI) and/or AA (CRA) (guidelines pg. E-6, Form IIB)
 - 1. For ICP analysis, were standards (CRI) @ 2x the CRDL or the IDL (whichever was greater) analyzed at the beginning and the end of each sample run, or at a minimum of twice/8 hour shift, whichever was more frequent?

yes X no

- For furnace AA analysis, were standards (CRA) analyzed at the beginning and the end of each sample run, or at a minimum of twice/8 hour shift, whichever was more frequent? yes no X
- Were the CRI and/or CRA standards analyzed after the ICV? yes X no
- 4. Were these data reported on Form IIB?

 yes X no
- 5. Were the raw data correctly transcribed onto Form IIB?

 yes X no

 Comments: No CRA was run at the end of the furnace AA analyses.

III. Blanks (guidelines pg. E-6, Form III)

- Was the initial calibration blank (ICB) analyzed immediately after the initial calibration verification (ICV)? yes X no
- 2. Was a continuing calibration blank (CCB) analyzed immediately after each continuing calibration verification (CCV)?

 yes X no
- 3. Was a preparation blank (PB) analyzed at a frequency of at least 1 in 20 samples?
 yes X no NA
- 4. How many elements were detected above the CRDLs? 0 (if 0, go to question 5)
 - 4a. How many elements were detected in the blanks at greater than one-half the amount detected in any sample?
- 5. Were raw data correctly transcribed onto Form III?

 yes no X

 Comments: Only one-half of the blanks for thallium were recorded on Form III. All other requirements were met.

IV. ICP Interference Checks (ICS) (guidelines pg. E-7, Form IV)

- 1. Was the ICS analyzed twice per 8 hour shift? yes X no
- Were the ICSs analyzed before and after samples? yes X no
- 3. Was any massive interference detected?

 yes no X
- 4. Were the ICSs within $\pm 20\%$ mean value? yes X no
- 5. Were raw data correctly transcribed onto Form IV? yes X no

Comments: All requirements met.

- V. Spike Sample Analysis (S) (guideline pg. E-8, Form V)
 - 1. Were spikes analyzed at a frequency of 1 in 20 samples? yes X no
 - Were spike recoveries correctly calculated? yes X no

$$% \frac{1}{2} = \frac{(SSR - SR)}{SA} \times 100$$

SSR = Spiked Sample Result

SR = Sample Result
SA = Spike Added

- 3. Were spike recoveries within the range of 75-125%? yes no X
 - 3a. For recoveries outside this range, were associated data flagged "N" by the laboratory on Forms I and V? yes X no NA
 - (an exception if granted where the sample concentration is >4X the spike concentration)
 - 4. Were raw data correctly transcribed onto Form V?

 yes X no
- * Refer to page E-9 (SOW 787) for information regarding the amount of spike to be added for each analyte and for other information about the Spike Sample Analysis.

Comments: For antimony and thallium, recoveries were 52.9% and 48.7%, respectively; therefore, positive values are flagged "J", estimated and undetected values are flagged "UJ". For selenium, recoveries were -33.1%, therefore, positive values are flagged "J", estimated and confirm the presence of selenium in the sample and undetected values are unusable and flagged "R", rejected.

- VI. Duplicates (D) (guidelines pg. E-11, Form VI)
 - Were duplicates analyzed at a frequency of 1 in 20 samples? yes X no
 - Were RPDs correctly calculated? yes X no

$$RPD = \frac{S - D}{(S + D)/2} \times 100$$

S = Sample
D = Duplicate

- 3a. For sample concentrations >5x the CRDL, were RPDs $\pm 20\%$? (limits of $\pm 35\%$ apply for soil/sediment/tailings samples) yes X no NA
- 3b. For sample concentrations >5x the CRDL, did duplicate analysis results fall outside the control window of \pm the CRDL?

 yes no X NA
- 3c. Where the RPDs exceeded the control limits, were the data flagged '*' on Forms I and VI by the laboratory?

 yes no NA X
- Were raw data correctly transcribed onto Form VI? yes X no
- * Other Considerations:
- Field blanks cannot be used for duplicate analyses
- Duplicates must be analyzed for each analytical method

Comments: All requirements met.

- VII. Laboratory Control Sample (LCS) Analysis (guideline pg. E-12, Form VII)
 - 1. Was an LCS analyzed for every sample delivery group or batch of samples, whichever was more frequent?
 - 2. Were recoveries within the 80-120% limit?

 yes X no

-if the recoveries were outside this range the analysis must be terminated, the problem corrected and the previous samples associated with that LCS redigested and reanalyzed.

3. Were the raw data correctly transcribed onto Form VII? yes X no

Comments: All requirements met.

VIII.	Furnace Atomic	Absorption	(AA)	QC Analysis	(guidelines	pg.	E-14,
	Form VIII)						

1. Does the raw data package contain absorbance values for two injections per sample, the average values and the relative standard deviation (RSD)?

yes

no X

2. For analyte concentrations > the CRDL, did the RSD for the duplicate injections agree within 20%? (if yes, go to question 3)

yes

no X

 $RSD = \underbrace{SD}_{M} X 100$

SD = Standard Deviation of Duplicate Injections

M = Mean of Duplicate Injections

2a. Were samples that exceeded the 20% criteria reanalyzed? yes ${\tt X}$ no

2b. Did any reanalyzed samples exceed the 20% criteria? yes X no

2c. If yes, did the laboratory flag the data of Form I with an
'M'?

yes X

no

Was the recovery of the spike > 40%? (if yes, go to question 4).

yes

no X

If no, was the sample diluted and rerun with another spike?

yes X no

4. Was sample absorbance >50% of spike absorbance?* (if yes, go to question 5).

yes

no X

* Spike absorbance = absorbance of spiked sample - absorbance of sample.

4a. For spike recoveries between 85 and 115%, were results reported to the IDL?

yes X no

 $RPD = \frac{(SSR - SR)}{SA} \times 100$

SSR = Spike Sample Recovery

SR = Sample Result

SA = Spike Added

- 4b. For spike recoveries outside the 85 and 115% range, were results reported to the IDL and flagged with 'W'?

 yes X no
- 5. Was spike recovery between 85 and 115%? (if no, go to question 6)
 - 5a. Were results quantified from calibration curve and reported to IDL?

yes no X

6. Was an MSA at 50, 100 and 150% of the sample absorbance analyzed?

yes X no

- 6a. Was each MSA analysis identified in the raw data along with the slope, intercept and correlation coefficient? yes X no
- 6b. Were these data correctly transcribed onto Form VIII?

 yes X no
- 6c. Were correlation coefficients(r) > 0.995?

 yes no X
- 6d. If no, were MSAs run once more?

 yes X no
- If the correlation coefficients were still > 0.995, data on Form I must be from the run with the best 'r' and the data on Forms I and VII must be flagged with a '+'.

Were these criteria met?

yes X

no

6e. Were all MSA obtained data marked with an 'S' or an S+ on form I?

yes X no

Comments: There was no raw data for duplicate injections for the thallium analysis. For the duplicate sample in the selenium analysis, the duplicate injections and the third injection was greater than 20%D. No flag was assigned since this was a QA sample. The thallium values for the following samples had on correlation coefficient <0.995 and are flagged "J", estimated: 4725H02, 4725H06, 4725H09 and 4725H11. The thallium and selenium values for the following samples had both correlation coefficients <0.995 and are flagged "R", rejected: thallium - 4725H03, selenium - 4725H01, 4725H04, 4725H05 and 4725H08.

IX. ICP Serial Dilution (L) Analysis (guidelines pg. E-12, Form IX)

1. Was an ICP serial dilution performed on each group of samples of a similar matrix (i.e., soil, water) and concentration (i.e., low, high) or for each sample delivery group, whichever was more frequent?

yes X no

2. For elements with concentrations >10% the CRDL, did any exceed the serial dilution results by more than 10%? (if no, skip questions 3 and 4)

yes X no

% difference =
$$\frac{I - S}{I}$$
 X 100

I = Initial Sample Result

S = Serial Dilution Result (instrument reading X5)

- 3. Which elements had concentrations that exceeded the 10% criteria? Cadmium
- 4. Did the laboratory flag these data with an 'E' on Form IX?

 yes X no
- 5. Were the raw data correctly transcribed onto Form IX?

 yes X no

Comments: Cadmium values are flagged "J", estimated due to high %D (14.5%).

- X. Instrument Detection Limits (IDL) (guidelines pg. E-13, Form XI)
 - 1. Were IDLs reported for each analyzed element?

 yes X no
 - Were IDLs reported for each instrument used? yes X no
 - Did the IDLs meet the contract requirements? (refer to pg. E-13, SOW 787)

yes no X

Comments: Lead was analyzed by ICAP due to high sample concentration. No action is taken due to these conditions.

- XI. Interelement Corrections for ICP (guidelines pg. E-13, Form XII)
 - 1. Were correction factors reported on Form XII? yes X no

Comments: All requirements met.

- XII. Linear Range Analysis (LRA) (guidelines pg. E-14, Form XII)
 - 1. Was a linear range verification standard analyzed? yes X no
 - 2. Was the results within $\pm 5\%$ of the true value? yes no

Holding Times

Limits: Metals - 6 months; Hg - 30 days; Cn - 28 days.

- 1. Verified date of sample receipt by laboratory 7-24-89
- 2. Date of preparation/analyses 8-10-89
- 3. Were holding times met? yes X no

Analyte	Matrix	Date Sampled	Prep Date	Holding Time		ng Time t/Met	
Mercury Metals	Low soil Low soil		8-10-89 8-10-89	23 days 23 days	30 days 6 months	Yes Yes	

-			1			-	LV SURFIRMAN.
	•	WORGANIC A	NALYSIS DATA S	HE	ET	1-	
.	_	THOUGHT				i 1	4725H01
- <u>-</u>				1.10	0074		TIME
Lab Name: SILVE	R VALLEY LARS.	INC.	Contract: 68	-wc	3-00/4	!-	
		21102		,	17751	1 -	- 4725H
SILV	/ER ca	se No.:	SAS No.	: -	<u>† 10101</u>	7 21	ос но.: <u>47а5</u> нс
Lab Code: SILV			·				
		T/		La	ab Sampi	Le :	ID:
Matrix (soil/	vacery:		-				
	1 ~ .			Da	ite Rec	eive	ed:07/24/89
Level (low/med	i): <u>Lo</u>	<u>vv</u>					
		1					
% Solids:	<u>LA</u>	<u>ما.</u>					- 44 10
				. .	aight):	M	GIKG
Co	ncentration	Units (ug/	'L or mg/kg dry	w	erdue, .	'	
=						•	<u>.</u> 1
				! _!			
	CAS No.	Analyte	Concentration	C	Q	М	
	100		<u> </u>	_		اا	
-	7400 00 =	Aluminum	18400.		\ <u></u>	罗	_
	7429-90-5	WTANTHON	19.8	-	N_	P	EKTI
	7440-36-0	Antimony_	83.2	i – i		$\cdot \tau$	1
³	7440-38-2	Arsenic		: — i	E	V	
	7440-39-3	Barium	1 <u> 270.</u>	::		ゥ	i
•	7440-41-7	Beryllium	1	! — ¦		D	TAS SAT
• ·	17440-43-9	Cadmium	17.6	!		5	
•	7440-70-2	Calcium_	15000.	!!		5	<u> </u>
~	7440-47-3	Chromium	<u>a1.9</u>	-		1	
:	7440-48-4	Cobalt		B		5	
	7440-50-8	Copper	a 39.	!		1	J 48
	7439-89-6	Iron	30800.	_		1	
		Lead	1790.	ا_ا		P	
· · · · · · · · · · · · · · · · · · ·	7439-95-4		6130.	I_I		1	
jani	[7439 - 95 - 4	Manganese	1260.	<u> </u>		P	
-	17439-96-5	Morcury	1.0			SY P	
<u>-</u> ਤ	7439-97-6	Mercary	23.5	1		12	
-	7440-02-0	NICKEL		i – i		1Z	
	17440-09-7	Potassium	3.1	i –	Ŧ N	E	TAD RAB
*	7782-49-2	Selenium_	9.7	i – i		P	}
	7440-22-4	STIVEL	239.	B		B	1
·	7440-23-5	Sodium	1 81	F	N	I E	ITXB
-	7440-28-0	Thallium_		1	· <u></u>	手	i
i	7440-62-2	Vanadium_		-	¦	P	İ
	7440-66-6	IZinc	<u> </u>	-	<u> </u>	巫	! !
	İ	Cyanide_		<u> </u> -	¦	122	ř
-			l	1_	·	'	' #A \
						Te	xture: MENIUM
Color Before:	BROWN	Clari	ty Before:		-		
an referen	•					72	tifacts:
Color After:	YELLOW	Clari	ty After:		-	AL	LIIACUS.
Coror wreer:			-				
Comments:							
commencs:	•						·····
	·						
							
	 						

1.	
INORGANIC ANALYSIS DATA	SHEET

EPA SAMPLE NO.

•						_ j 4	4725HO2
Lab Name: SILVE	R VALLEY LABS	. INC.	Contract: 6	3-W	8-0074	_ i.	
Table SILV	VER	Wo -	CIC VA	. 1	47251	۱ ،	sog no.: 47a5HC
Lab Code: SIL		ase No.:	JAJ NO.	•	1 1001	•	TOUTH
Matrix (soil/	water): <u>S</u>	<u>I</u> L		L	ab Samp	le	ID:
Level (low/med	i): <u>LO</u>	W		D	ate Rec	eiv	red: 07/24/89
% Solids:	73	<u>3.</u> 0					·
-			er an marilea des	• •	.aiab#\	. Λ	NEIKE
Co	ncentration	Onics (ug/	'L or mg/kg dry	W	erduc)		ELIVE
	CAS No.	Analyta	 Concentration		1 0	I M	
	i cas no.	Midifice		į		"	
	7429-90-5	Aluminum	8620.	i_	}	17	İ
	7440-36-0	Antimony	201.	1_		P	IJAS
	7440-38-2	Arsenic	590.	1	1	IP	1
	7440-39-3		147	Ī	E	P	İ
		Beryllium		18		P	
•	7440-43-9	Cadmium	91.4			17	ITAS
•	7440-70-2		25400	i –			
	7440-47-3		.77	U		18	'i
	7440-48-4	1	43.5			7	
	7440-50-8	· — ·	753	i –		17	• • •
	7439-89-6		181000			P	'i
	7439-92-1	•	14200		•	17	ì
	7439-95-4		9430			星	i
	7439-96-5	•	1730			三	j
		Mercury	. 4.9	i		ICV	ì
	7440-02-0		21.5			1Z	j.
	7440-09-7		1160.	B1	1	是	أحمد
		Selenium	46.2		SE N	E	18/22/89 JAS
	7440-22-4	Silver	47.5			17	1
	7440-23-5		181	BI		卫	
	7440-28-0		3.6	BI	SN	E	I XB
		Vanadium_	19.0			7	
	7440-66-6	Zinc	15500.				1
		Cyanide				NR	
		i					

Color Before: DROWN	Clarity Before:	Texture: / EATU
Color After: YELLOW	Clarity After:	Artifacts:
Comments:		. *
	·	

CI	Carer): SO LOY 177 Pentration AS No. 429-90-5 440-36-0	. INC. se No.: L W O Units (ug/	Contract: 68 SAS No.: Concentration	La La Da	3-0074 1726 ab Samp ate Receipht)	Hsole eiv	red: <u>07/24/</u> 8
Lab Code: SILVER Matrix (soil/wate Level (low/med): % Solids: Conce	caser): SO LON 77 Pantration AS No. 429-90-5 440-36-0	Se No.:	SAS No.:	La Da	+ 726 ab Samp ate Rec eight)	Hsole eiv	IDG No.: 4725 ID: red: <u>07/24/</u> 8
Lab Code: SILVER Matrix (soil/wate Level (low/med): % Solids: Conce	caser): SO LON 77 Pantration AS No. 429-90-5 440-36-0	Se No.:	SAS No.:	La Da	+ 726 ab Samp ate Rec eight)	eiv	ID: ed: <u>07/24/</u> 8
Matrix (soil/water): Level (low/med): Solids: Conce	LOV 17 20 20 21 20 21 21 21 21 21 21 21 21 21 21	W 9 Units (ug/ Analyte		Da	eight)	: <u>M</u>	red: <u>07/24/</u> 8
Level (low/med): % Solids: Conce	LON 77 20 20 20 20 20 20 20 20 20 20 20 20 20	W 9 Units (ug/ Analyte		Da	eight)	: <u>M</u>	red: <u>07/24/</u> 8
Level (low/med): % Solids: Conce	LON 77 20 20 20 20 20 20 20 20 20 20 20 20 20	W 9 Units (ug/ Analyte		· w	eight):	: <u>M</u>	
Conce	AS No. 429-90-5 440-36-0	Units (ug/				ļ	16/1/16
Conce	AS No. 429-90-5 440-36-0	Units (ug/				ļ	16/1/6
CI	AS No. 429-90-5 440-36-0	Analyte				ļ	1
 7 4	429-90-5 440-36-0		Concentration	C		1	
	440-36-0	1 A liminim		<u> </u>	Q	M	
	440-36-0	CATUMILIUM :	7650	1_		PPP	
17/		Antimony	114.	_	<u>N</u>	5	142
•	440-38-2	Arsenic_	<u> </u>	_		1	.]
■ =		Barium	130.		<u>E</u>	7	
17.		Beryllium	.81	9		.! 두	EAT
177	440-43-9	Cadmium	82.0	<u> -</u>		$\frac{r}{a}$	17 40
	440-70-2	Calcium	2610	<u> </u>		ᆜᆃ	
	440-47-3	Chromium_	1.0			P	.1
	440-48-4	Cobalt	38.5	!-!		! 5	.1 1
		Copper	459	!-!		15	.]
	439-89-6	Iron	148000	-		15	. 1
74	439-92-1	Lead	9880	-	<u>-</u>	⊹╁╆╌	,
		Magnesium	8480	-		PPP	. !
174	439-96-5	Manganese	1630.	<u> -</u>		ev	
	439-97-6	Mercury	<u> </u>	-		P	•
174		Nickel	28.8	B		P	i
		Potassium	<u> </u>		* N	F	0000
	782-49-2	Selenium_	30.3	<u>ו</u> דו	لبحت	7	08/22/84
	440-22-4	Silver	173	0		, 7	1
	440-23-5	Thallium_	4.1		+ 1	1E	THIRMS
	440-28-0	Thailium_ Vanadium	21.2	_		12	
	440-62-2 440-66-6	Zinc	15100			IL,	
	440-00-0	Cyanide				INE	Ţ
! —		1		<u> </u>	İ	.	
<u></u>		1				~ -	xture: MED
Color Before:	Rown		ty Before:		-		tifacts:
Color After: YE	ELLOW	Clari	ty After:		 -	AÏ	TIIduus.
Comments:							

Cas No. Analyte Concentration C Q M T429-90-5 Aluminum 25100. N P T440-36-0 Antimony Ae0. N P T440-38-2 Arsenic 7710. P P P P P P P P P				1	~ 2 2 7	**************************************	I	epa sam	PLE_NO	1.
Lab Name: SILVER VALLEY LABS INC. Lab Code: SILVER Case No.: SAS No.: 4735H SDG No.: 4735H Matrix (soil/water): SOIL Level (low/med): LOW Concentration Units (ug/L or mg/kg dry weight): MG/K6 CAS No.			INORGANIC.	analisis data :) ELL		[4724	SHA	
Level (low/med): LOW Date Received: 07/24/89	Lab Name: SILV	ER VALLEY LABS	. INC.				_ _			
Cas No. Analyte Concentration C	Lab Code: SIL	VER Ca	ıse No.:	SAS No.	: 4	47a5	H s	DG No.	: 47a	<u>5</u> H
Cas No. Analyte Concentration C	Matrix (soil/	water): <u>S</u>	IL		L	ab. Samp	ole	ID: _		
CAS No. Analyte Concentration C Q M 7429-90-5 Aluminum 25100. T 7440-36-0 Antimony 320. N P 7440-38-2 Arsenic 7210. P 7440-41-7 Beryllium 1.9 P 7440-43-9 Cadnium 100. P 7440-47-3 Chromium 33.2 P 7440-48-4 Cobalt 101 P 7440-48-4 Cobalt 101 P 7439-92-1 Lead 13600 P 7439-95-4 Magnesium 33800 P 7439-97-6 Mercury 5.5 CV 7440-02-0 Nickel 27.0 P 7740-22-4 Silver 3600 P 7740-22-4 Silver 3600 P 7740-22-5 Sodium 15.4 P 7440-22-6 Thallium 15.4 P 7440-22-6 Thallium 23.2 P 7440-22-6 Thallium 23.2 P 7440-22-7 Vanadium 19.5 P 7440-66-6 Zinc 19780 P 7440-66-6 Zinc 19780 P 7440-66-6 Zinc 19780 P 7440-66-6 Zinc 19780 P 7440-66-6 Zinc 19780 P					D	ate Rec	eiv	ed: 07	1/a4/	39
CAS No. Analyte Concentration C Q M	% Solids:	5	<u>ء.</u> ج							
7429-90-5	Co	oncentration	Units (ug/	L or mg/kg dry	, r	reight)	: <u>M</u>	GIKE	ک	
7429-90-5		i	1	1	1	l	1	-		
7440-36-0 Antimony Age. N F TAS 7440-38-2 Arsenic 77/a. F F 7440-39-3 Barium 1.90. F F 7440-41-7 Beryllium 1.90. F F 7440-43-9 Cadmium 1.90. F F 7440-47-3 Chromium Ag. G F 7440-48-4 Cobalt 1.91. F 7439-89-6 Copper 2.49. F 7439-89-6 Iron 584.00 F 7439-92-1 Lead 1.36.00 F 7439-95-4 Magnesium 236.00 F 7439-96-5 Manganese 2.720. F 7440-02-0 Nickel 2.7.0 F 7440-02-0 Nickel 2.7.0 F 7440-22-4 Silver 36.0 F 7440-22-4 Silver 36.0 F 7440-22-5 Sodium 1.9.4 F 7440-22-5 Sodium 1.9.4 F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-67-1 Clarity Before: Texture: MeDium		CAS No.	Analyte	Concentration	C	Q	ĺМ			
7440-36-0 Antimony Age. N F TAS 7440-38-2 Arsenic 77/a. F F 7440-39-3 Barium 1.90. F F 7440-41-7 Beryllium 1.90. F F 7440-43-9 Cadmium 1.90. F F 7440-47-3 Chromium Ag. G F 7440-48-4 Cobalt 1.91. F 7439-89-6 Copper 2.49. F 7439-89-6 Iron 584.00 F 7439-92-1 Lead 1.36.00 F 7439-95-4 Magnesium 236.00 F 7439-96-5 Manganese 2.720. F 7440-02-0 Nickel 2.7.0 F 7440-02-0 Nickel 2.7.0 F 7440-22-4 Silver 36.0 F 7440-22-4 Silver 36.0 F 7440-22-5 Sodium 1.9.4 F 7440-22-5 Sodium 1.9.4 F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-66-6 Zinc 1.570. F 7440-67-1 Clarity Before: Texture: MeDium	-	7429-90-5	Aluminum	25100	i-		`i7	ì		
7440-38-2 Arsenic 276a E P					i-	N		EXT		
7440-39-3 Barium		•		· —————	i-	; - 	iP	1		
7440-43-9 Cadmium 100.					i-	Ē	10	i		
7440-43-9 Cadmium 100.		•	•		18		1P	i		
7440-70-2 Calcium Sale0 7440-47-3 Chromium 33.2 9 1 1 1 1 1 1 1 1 1		•	• • •	·	 2		17	FAT		
7440-47-3 Chromium 33.2 P 7440-48-4 Cobalt 10.1 P P 1740-50-8 Copper 1740-50-8 Copper 1740-50-8 Copper 1740-50-8 Copper 1740-50-6 P P P P P P P P P					-		17			
7440-48-4 Cobalt					_		P	j		
7440-50-8 Copper					8		す	i		
7439-92-1 Lead		•	• • • • • • • • • • • • • • • • • • • •				i尹	i		
7439-92-1 Lead		•					i 🐬	İ		
7440-09-7 Potassium 6270							P	i		
7440-09-7 Potassium 6270		•			i		P	İ		
7440-09-7 Potassium		•	•		_i		P	ĺ		
7440-09-7 Potassium					-i		CV	İ		
7440-09-7 Potassium					-i		P			
7782-49-2 Selenium					-		7			
7440-22-4 Silver					_i	+ N	F	TAS	RAS	
olor After: Clarity After: Artifacts:					-i		17		_	
olor After: Clarity After: Artifacts:					Bi		P			
olor After: Clarity After: Artifacts:						N	FI	CKI		
olor After: Clarity After: Artifacts:	·	•	•				[卫]			
olor Before: DROWN Clarity Before: Texture: MEDIUM olor After: Artifacts:	•	•	·		\Box 1					
olor Before: DROWN Clarity Before: Texture: MEDIUM olor After: Artifacts:			· · · · · · · · · · · · · · · · · · ·		$\exists i$		NE	-		
olor After: KELLOW Clarity After: Artifacts:			i							
	Color Before:	BROWN	Clarit	y Before:			Tex	ture:	MED	II(/
omments:	Color After:		Clarit	y After:			Art	ifacts	:	
	Comments:									_

7/37

U.S. EPA -- CLP

		4	1. 4.75 m	Ł		EPA SAME	PLE_NO.
	1	NORGANIC A	NALYSIS DATA S	HEE		4725	H05
		5.46	Contract: 68	-W8-	0074	1.00	
Lab Code: SILVE		. INC se No.:	SAS No.:	: 4	725H	SDG No.:	4725H
				Lab	Sampl	e ID:	
Matrix (soil/w	rater): <u>50</u>	IC					16.1100
Level (low/med	10	_		Dat	e Rece	eived: 07	144189
% Solids:	78.	<u>.3</u>				41 - 11-	
Co	ncentration	Units (ug/	L or mg/kg dry	we:	ight):	<u>M6/16</u> —	-
		1	1	l l) 0	M I	
	CAS No.	Analyte	Concentration		ر اا	ĺ	
	7429-90-5	Aluminum	2810	i_i_	!	Pi	
	17440-36-0	Antimony_	178.	1_14	<u></u>	医 工物	
		Arsenic_	320	_ _		$\frac{P}{A}$	
	17440-39-3	Barium	134	<u> </u>		7	•
	17440-39-3	Beryllium		IJ [_		[]	
	• • • • •	Cadmium	149		1	卫工程	
	7440-43-9 7440-70-2		89700		ا	<u>f</u> !	
		Chromium_	10.9	$\lfloor \lfloor \rfloor \rfloor$		P	
	7440-47-3 7440-48-4		5,3	131		P	
	7440-48-4 7440-50-8	Copper	613	_ _	[1	
	7440-30-6 7439-89-6	Trop	44800.	1_1_		产	
	7439-89-8 7439-92-1	I Lead	9550	_ _		子	
	7439-92-1 7439-95-4	Magnes ium		<u> </u>		7	
	7439-95-4 7439-96-5	IMancanese		_ _		/ [
	17439-97-6	Mercury	. 1.5	 _ _		<u>ev</u>	
			2.9	<u> B </u> _		$\frac{\overline{P}}{P}$	
	7440-02-0	Potassium	194	8]	$\frac{\rho}{ \rho }$	940
	17782-49-2	Selenium_	161	1_1=	FV_	亡 728	K M-S
	17440-22-4	Silver	60.9	1_1_	!	1	
	17440-23-5	Sodium	84.6	BI_		7	
	17440-28-0	Thallium	12.7		<u> </u>	正 7/8	
•	17440-28-0	Vanadium	8.6	B !_	!	7	
•	17440-66-6	Zinc	26400.	_ _	!	<u>P</u> !	
	1	Cyanide_		<u> _</u> _	!	WE!	
	<u></u>			 _ _		!	4.
Color Before:	BROWN	Clari	ty Before:			Texture:	MEDIU
Color After:	YELLOW	Clari	ty After:			Artifacts	:
Comments:							·

EPR SAMPLE NO. INORGANIC ANALYSIS DATA SHEET 1725H06 Contract: 68-W8-0074 Lab Name: SILVER VALLEY LABS., INC. SDG No.: 4725H Lab Code: SILVER SAS No.: 4/25H Case No.: Lab Sample ID: Matrix (soil/water): 50IL Date Received: 01/ Level (low/med): % Solids: Concentration Units (ug/L or mg/kg dry weight): MS/K6_ Concentration | C| M CAS No. Analyte 17429-90-5 | Aluminum 11100. 40.8 17440-36-0 | Antimony 1 48 |7440-38-2 | Arsenic 241 E |7440-39-3 |Barium 944 17440-41-7 | Beryllium B .85 |7440-43-9 | Cadmium 62.3 PATI 17440-70-2 | Calcium 46900. |7440-47-3 | Chromium .71 Ц |7440-48-4 | Cobalt 64.4 17440-50-8 | Copper 256 |7439-89-6 | Iron 41400. |7439-92-1 | Lead 3790 13300. |7439-95-4 | Magnesium |7439-96-5 | Manganese | 201000 De austi |7439-97-6 |Mercury **3.24** 69.7 |7440-02-0 |Nickel |7440-09-7 | Potassium 1870 PAT |7782-49-2 |Selenium 5.6 |7440-22-4 |Silver 13.7 344. B |7440-23-5 | Sodium SAT 5 N 8.5 17440-28-0 | Thallium |7440-62-2 | Vanadium <u> 34.8</u> |7440-66-6 |Zinc 18800. Cyanide Texture: MEDIUM Penny Clarity Before: Color Refore.

		2000-					
Color	After:	YELLOW	Clarity	After:		Artifacts:	
Comme	nts:						
	·		 				
							

		i á -	1		~			LE. NO.
	;	inorganic A	NALYSIS DATA S	HE	ET.	!-	1070	11 47
·				เมณ	OO74	4	1725	HOI
Lab Name: SILVE	R VALLEY LABS.	, INC.	Contract: 68	-40	-0074	_ ! _	· · · · · · · · · · · · · · · · · · ·	110-
Lab Code: SILV	/ER Ca	se No.:	SAS No.	: 5	<u> 1725</u>	H s	DG No.:	4123
Matrix (soil/		TI		La	b Samp	ole :	ID:	
Matrix (soll/	vater):		•		_	_		15.111
Level (low/med				Da	te Rec	ceiv	ed: 07/	<u> </u>
% Solids:	<u>bb</u>	8						
& Solins.	<u> </u>		_		•	M	-14	
Co	ncentration	Units (ug/	L or mg/kg dry	. ME	eight)	:		
-							į	
		1			Q	ім	} •	
	CAS No.	Analyte	Concentration	~	¥	Ì	1	
	l	.				卫	i	
	7429-90-5	Aluminum_	9710	¦−¦·	N	10	EAT	
	7440-36-0	Antimony_	37.6	¦-¦:	<u> </u>	P		
	7440-38-2	Arsenic	·	¦−¦·	E	7		
	7440-39-3	Barium	384	B		1	İ	
	7440-41-7	Beryllium	·	121		一	TAS	
	7440-43 - 9	[Cadmium_	102.	¦−¦·		17	12/2	
	7440-70-2	Calcium_	90700	·		P	Ì	
	7440-47-3	Chromium_	20.4	¦-¦·		iŻ	j	
	7440-48-4	Copart		— ·		- 1	İ	
	7440-50-8		64900.	- ·		7	i	
	7439-89-6	Iron	3 a 50	- ·		中中中中以中中	İ	
	7439-92-1	Lead		i-i		P	į	
	7439-95-4	Magnesium	19100	i-i		P	İ	
	7439-96-5			- ·		icv	ĺ	
	7439-97-6	Mercury	182	- ·		P	İ	
	7440-02-0	Nickel	· ————	i – i		7	ĺ	
	7440-09-7	Potassium	9,2	i-i	N	IE	TAS	
	17782-49-2	logilyar	23.9	i Ti			1	
	7440-22-4 7440-23-5	ISOGIUM	254	Bi		中	1	
	7440-23-5	IThallium	10.1	$I \subseteq I$	SY	IE	128	
•	17440-40-0	Vanadium_	·	1[[IP	Į.	
•	17440-62-2	Zinc	17600.	<u> </u>		_ایم	!	
	1 440-00-0	Cyanide_		_ .		146	!	
	<u> </u>			I_I.		_	l	
C	\	. !				197	xture:	MED.
Color Before:	BROWN	Clari	ty Before:					
Color After:	YELLOW	Clari	ty After:			Ar	tifacts	:
Comments:								
lomments:								

INORGANIC ANALYSIS DATA SHEET

EPA	SAMPLE NO.
4454	

•	-					j 4	+725H08
671.15	D 1/41 / 51/ / 400	740	Contract: 68	-WE	3-0074	. İ	1 10101100
Lab Name: SILVE		. INC.		-,	Insell	_	og No.: 4725HC
Lab Code: SILV	ER Cas	se No.:	SAS No.:				
Matrix (soil/W	rater): So	IL			ab Sampi		· · · · · · · · · · · · · · · · · · ·
Macrix (South	_		•	ъ.	sto Pac	o i w	ed: <u>07/24/89</u>
Level (low/med	i): <u>Lo</u>	\mathcal{W}		טפ	ace Reci	ET A	ea. 01/4 110
	64.	1.					i i
% Solids:	LT:	<u> </u>				A A	~ 111 C
Co	ncontration	Units (ug/	L or mg/kg dry	W	eight):	/ <u>vy</u>	5/KQ
CO	iicelictactou	011200 (43)					
							·
	CAS No.	Analyte	Concentration		Q	М	
	İ	l		-	<u> </u>	7	
	7429-90-5	Aluminum_	14000	-	N_	┇	丁档
	7440-36-0	Antimony_	<u> </u>	-	-	P	
	7440-38-2	Arsenic	286	-	E	P	
	7440-39-3	Barium		ē	: ——	争	į
	7440-41-7	SerAirm	82.3		1	P	Z 148
	7440-43-9	Calcium	85800	i —		17	
	7440-70-2 7440-47-3	Carcium	16.5	_		17	1
	17440-48-4	Cobalt	33.3			17	[
	17440-48-4	Copper	567			7	· ·
		Iron	49200	_	l	19	'
		Lead	3510		ــــــــــــــــــــــــــــــــــــــ	7	
		Magnesium	18400	_		1	
	7439-96-5			_		了	. ·
	7439-97-6		·	_		CV P	
	7440-02-0		25.8	_	<u> </u>	15	<i>i</i>
	17440-09-7	Potassium	2400	_	! 	<u>-</u>	THIRM "
	17782-49-2	Selenium_	/3.2	<u> </u> _	+1	5	1 7 % 7 %
	17440-22-4	Silver	36.9	_		至	
	7440-23-5	Sodium	276	8	SN	는	777
	7440-28-0	Thallium_	14.2	Ž		12	7.341
	1	Vanadium_			¦	1	
•	7440-66-6	Zinc	18300	-	¦	TIZ	
		Cyanide		-	<u> </u>		Ī
,	<u> </u>			· — ·	·		10-1-1
Color Before:	BROWN	Clari	ty Before:	<u> </u>	■● .	Te:	xture: MENIU
Color After:	TELLOW	Clari	ty After:		-	Ar	tifacts:
Comments:							

U.S. EPA -- CLP

	÷ 7		1.		EPA SAMPLE NO.
• .	,	INORGANIC A	NALYSIS DATA S		4725H09
	FD VALLEY LAGS	7110	Contract: 68	-W8-0074	1
Lab Name: SILV	ER VALLEY LABS.	, INC.		117-61	H SDG No.:4725
Lab Code: SIL	VER Ca	se No.:	SAS No.:		
Matrix (soil/		TL		Lab Samp	le ID:
Matrix (soll)			•	- · -	1111 A7174/
Level (low/me	(d): <u>LO</u>	<u>W</u>		Date Rec	eived: 07/24/
	12.	6			
& SOLIUS.		· ·		weightly	. MS/KG
Co	oncentration	Units (ug/	L or mg/kg dry	weight)	
		1	ł i		!!!
	CAS No.	Analyte	Concentration	CIQ	M
	i	İ		-	
	7429-90-5	Aluminum	10900	- 	产工格
	7440-36-0	Antimony_	107	_ N	D 3 70
	7440-38-2	Arsenic	1295	- 	
	7440-39-3	Barium	1 <u>229</u>	<u> </u>	1 <u>P</u> 1 <u>P</u> 1 <u>P</u> 1 TX8
	7440-41-7	Beryllium	1.4	8	1-1-10
	i7440-43-9	Cadmium	90.2		
	17440-70-2	Calcium	38700	-	P P P P
	17440-47-3	Chromium_	16.3	-	15
	7440-48-4	Cobalt	20.1	<u> - </u>	
	7440-50-8	Copper	498	\ -	·
	7439-89-6	Iron	68700	_	15
	7439-92-1	[Lead	6970	- - 	
	7439-95-4	Magnesium	11100.	├ - ├	() () () () () () () () () ()
	7439-96-5	Manganese	3070	╎ 一 ╎────	101
	7439-97-6	Mercury_	5.0	-	7
	7440-02-0	Nickel	16.3	-	P OKX
	17440-09-7	Potassium		SY	三丁粉
	17782-49-2	Selenium_	1	· _ · · · · · · · · · · · · · · · · · ·	P
	17440-22-4	Silver	36.2	B	P
	7440-23-5	Sodium	320	SN	巨丁粉
•	7440-28-0	Thallium_	31.2		P
	17440-62-2	Vanadium_	15900.		中里丁烟
•	7440-66-6	Zinc Cyanide			INCI
		ichamme			.11
_		.	·		Mai
Color Before:	KROUNKI	Clari	ty Before:		Texture:
cotor Refore:	17000.4	<u></u>	- <u>,</u>		
Color After:	Your	Clari	ty After:	·	Artifacts:
Comments:					
Comments:					

			100		EPA SAMPLE NO:
	:	inorganic : A	nalysis data s		4725 H10
Lab Name: SILVE	R VALLEY LABS.	. INC.	Contract: 68		·
Lab Code: SIL		se No.:	SAS No.	: <u>47а5</u> н	sog No.: 4725
Matrix (soil/		IL		Lab Sampl	
Level (low/me			•	Date Rece	ived: 07/24/8
	79				
₹ Solids:					440/16
Co	ncentration	Units (ug/	L or mg/kg dry	weight):	MG/86-
	CAS No.	Analyte	 Concentration	1 1	M
	7429-90-5	Aluminum	20200.	!_! !	P. 1. TAS
	17440-36-0	Antimony_	10.1	u N	P 47
	7440-38-2	Arsenic	54 70-	WIS !	E! 8230)
	7440-39-3	Barium	408	_ <u> £</u>	<u></u>
	7440-41-7	Beryllium	1.6	 _	<u>P</u> !
	7440-43-9	Cadmium	2.2		P J 788
	7440-70-2	Calcium	9640	<u> _ </u>	$\frac{p}{a}$!
	7440-47-3	Chromium_	18.5	! _ !!	
	7440-48-4	Cobalt	10.9	<u> </u>	ア ア
	7440-50-8	Copper	Y0.7	<u> _</u>	<u>T</u>
	7439-89-6	Iron	25500.	!-!!	<u> </u>
	7439-92-1	Lead	108	!-!!	
	7439-95-4	Magnesium	6360	!-!!	7
	7439-96-5	Manganese		! ~! !;	<u>\$\frac{\phi}{a\psi}\ </u>
	7439-97-6	Mercury	l	<u> </u>	<u>cv</u>
	7440-02-0	Nickel	17.0	[-[-O I
	7440-09-7	Potassium	6050	!_!- <u></u> }	<u>P</u>
	7782-49-2	Selenium_	5.6	U	도
	7440-22-4	Silver	· <u> </u>	<u> </u>	
	7440-23-5	Sodium	389	<u> </u>	FIRMO PI FIUJAB
_	7440-28-0	Thallium	,23	U N	子! 47 6
•	7440-62-2	Vanadium_	31.7	!!!-	<u>r </u>
•	7440-66-6	Zinc	302.	!!!:	V !
	i	Cyanide		!_!!	ACT.
	i ———	i		_ .	!
(<u>'</u>				Texture: MED
Color Before:	Blown	Clarit	ty Before:	<u> </u>	Texture: / Kil

Artifacts: color After: YELLOW Clarity After: Comments:

			1		-	1	epa sam	PLE NO.
		INORGANIC .	analysis. Data	SA.	ÇET	!	11726	- 11 . /
Lab Name: SIL	VER VALLEY LARS	TNC.	Contract: 6	8-h	18-0074	_	4125	5H11
Lab Code: SI		ase No.:	SAS No.		A -	H s	EDG No.	: 47251
i	_				ab San			
-Matrix (soil	/water):	<u> </u>	•			-		1 1100
Level (low/m	ed): <u>LO</u>	\mathcal{W}		D	ate Re	ceiv	red: 07	/a4/89
% Solids:	37	1.a						
			'L or mg/kg drj	Y &	veight)	: <u>N</u>	Va/KG	·
	CAS No.	Analyte	 Concentration	C	Q	М		
	7429-90-5	Aluminum	19500.	i	<u> </u>		i	
		Antimony	142.	i-	i <u>N</u>	7	17AS	
	7440-38-2		251.	i-	i	-ip		
_			1068	i -	E	P	i i	
		Beryllium		B		P	İ	
	7440-43-9		(85			P	JA8	
•	7440-70-2		249000			7		
	7440-47-3		18.2			IZ	Ì	
4	7440-48-4	•	5.9	10		过	Ì	
	7440-50-8	Copper	770	1_1		1 0	1	
	7439-89-6		156000	_		P	1	
! !	7439-92-1	Lead	12500	_		1P		
√	7439-95-4	Magnesium	29700			ع إ	<u> </u>	
	7439-96-5		19400	[_]		P	[
5 1	7439-97-6	•		<u> _</u> !		CV PP E		
	17440-02-0		32.1	-!		-! 4	İ	
		Potassium	<u> </u>	-	7	- -	40	
	17782-49-2	Selenium_	19.9	-!	N		Z*S	
	17440-22-4		60.6			P	j	
	7440-23-5 7440-28-0			A	5 N	나는	T 78	
	7440-28-0 7440-62-2		<u> </u>		<u> </u>	-	7 73	
1	7440-62-2		24000	-;		10		
-	17440-00-0	Cyanide_		-;		NR	<u>.</u>	
		Cyaniac_		-;			!	
	\	·	ا مدسوسیسیسی ا	-'	. "	. ' '		Λ_{Λ}
Color Before:	Leown	Clarit	y Before:		•	Tex	ture:	MEDIU
Color After:	YELLOW	Clarit	y After:			Art	ifacts	
Comments:								
-	- <u>-</u>							

		U.S.	EPA CLP					- 1 .
	÷	INORGANIC"	1_ Analysis data :	5HI	EET	ı.	 	PLE NO.
Lab Name: SILVE	R VALLEY LABS	INC.	Contract: 68	3-W	8-0074	_ .	4125	5HI2
Lab Code: SILV	/ER C	ase No.:	SAS No.	: 1	+7a5	H :	SDG No.	:4725HC
Matrix (soil/w	_	DIL _		L	ab Sam	ple	ID:	
Level (low/med		_	•	D	ate Re	cei	ved: 07	1a4189
% Solids:	53							•
Co	 _		L or mg/kg dry	, r	reight)	: <u>M</u>	s/Ka	- -
	CAS No.	Analyte	 Concentration	C	Q	i i M		
		Aluminum_		_	4	P		
		Antimony_		_	14	F	ITAS	
	17440-38-2		839	_	<u> </u>			
	7440-39-3		557	l_	<u> </u>	12	.].	
	7440-41-7	Beryllium	1.6	ø	l	12	.1	
	7440-43-9		131	_		12	BATI	
	17440-70-2	Calcium	167000			10	1	
	7440-47-3	Chromium		U		17	1	
	7440-48-4		53.3			19	Ĩ	
	7440-50-8	•	456			10	ì	
	•	Iron	132000	_i		P	Ϊ	
	•	· •	6900	_		17	i	
	•	Magnesium		-i		17	i	
	•	Manganese	23700	_i		P	i	•
	•	Mercury	.73	-i		ΊŻΫ	i	
		Nickel	26.3	-i		EV P	j	
		Potassium	1690.	-i		一	i	
		Selenium	2.5	٦i	SN	一	24	
	7440-22-4		22.5	-;	<u> </u>	17	I TAS	
	7440-23-5		206	Bi		1	į	
	7440-23-3	· · · · · · · · · · · · · · · · · · ·		Z:	5 N	庄	EAT	
	7440-28-0		21.0	δİ	<u> </u>	15	17 40	
		·		띡		17] {	
į	7440-66-6	Zinc		-¦			i !	
_		Cyanide	<u> </u>	-!			-	
		l	!	_'		ا ـــــــا	I	4.
Color Before:	= Rown	Clarit	y Before:			Te	cture:	MEDIUM
Color After:	TELLOW	Clarit	y After:		•	Art	cifacts	:

Comments:

			1_		·	1	epa sample:no:
		INORGANIC .	analysis data	SM	EET	1	100 - 11.0
Lab Name: SIL	VER VALLEY LABS.	. INC.	Contract: 68			_ l_	4725H13
Lab Code: SI	LVER Ca	se No.: _	SAS No.	: 4	4725+	l s	idg No.: 4725/
Matrix (soil,	/water): So	IL			ab Samp		
Level (low/mo	ed): <u>Lo</u>	$\underline{\mathcal{W}}$		D	ate Rec	eiv	red: 07/24/89
% Solids:	72	ے.					
			/L or mg/kg dry	W	reight)	. <u>/</u>	16/KG
 <u></u>	CAS No.	Analyte	 Concentration	 C 	Q	 M	l !
	7429-90-5	Aluminum	15200.	i –	,	i₹	Ï
)	17440-36-0		53.9	i –	N	7	ITXS
· •	7440-38-2		211	i –		P	
	7440-39-3	· —	209	i –	E	P	i
	7440-41-7		·	1		17	Ì
· 	7440-43-9		43.9			17	TAB
•	7440-70-2		14500			P	i
	7440-47-3		//.8			P	i ·
.i	•	Cobalt	24.6			17	i
b	•	Copper	231			P	j .
_	•	Iron	86100			P	į
•	•	Lead	4430			17	
	7439-95-4	·	6340			IZ	
	7439-96-5	•	1560			卫	,
7	7439-97-6		· 3.3			CV	
∌	7440-02-0		22.4	_1		卫	
	7440-09-7			\exists I		12	
.	7782-49-2	Selenium_	25.1	_1	N_	IE	EX T
	7440-22-4		15.5	_1		12	
•	7440-23-5	Sodium	215	BI		PPF	
	7440-28-0	Thallium	1.2	61	<u>N</u>	旦	TH
<i>\$</i>	7440-62-2	Vanadium_	40.5	_1		1	
•	7440-66-6	Zinc	8580	_			
	i i	Cyanide	!	_!		MEI	•
•				[
Color Before:	BROWN	Clarit	y Before:			Tex	ture: MEDIU
Color After:	YELLOW	Clarit	y After:		• .	Art	ifacts:
Comments:							
	- <u></u>						
					· · · · · · · · · · · · · · · · · · ·		
·							

1... TNORGANIC ANALYSIS DATA SHEET:

EPA.	SYR	1 1 10 100	No.
445.48	-	-	- 61 Y

	1	inorganic A	MALYSIS DATA S	AREL.	4725H14				
•			a	-WR_007A	14 105H-14				
Lab Name: SILVE	R VALLEY LABS.	. INC.	Contract: 68		.1				
Lab Code: SIL	/ER Ca	se No.:	735L SAS NO.	: 4725H	sdg No.: 4725HC				
			BC 149	Lab Sampl					
Matrix (soil/	water):	<u>)T</u>	8.2	_					
Level (low/med): LOW Date Received: 07/24/89 * Solids: Tag 17.4 ************************************									
% Solids:	PLL	977.4.	ic gran						
		<u></u> , •			MEIKE				
Co	ncentration	Units (ug/	'L or mg/kg dry	weight):	MATVO				
	1	1	i	1 1					
	CAS No.	Analyte	Concentration	ici a i	мĺ				
	l can no.	1		 _ 	! .				
	7429-90-5	Aluminum	4440	<u> </u>	<u> </u>				
	7440-36-0	Antimony_	/83	<u> </u>	4.1743				
	17440-38-2	Arsenic	555	!_!!	<u>P</u> .				
	7440-39-3	Barium	66.0	- E	7				
	7440-41-7	Beryllium	.63	[8]	戸 上 上 上				
•	7440-43-9	Cadmium	13	!-!	P JAS				
•	7440-70-2		18900	!_!	7!				
	7440-47-3		1 .72	K	<u> </u>				
	7440-48-4		76.8	_	<u>7</u>				
	7440-50-8		446.		<u> </u>				
	7439-89-6		263000	_					
	7439-92-1		12200.	_ <u>-</u>	平 i				
		Magnesium	5880.	<u> </u>					
	7439-96-5			I_	<u> </u>				
	7439-97-6		181	_	E 748				
•	7440-02-0		31.4	_	$\frac{P}{2}$				
	7440-09-7	Potassium	657	<u> </u>	$\frac{\rho}{ \rho }$				
	7782-49-2	Selenium	84.0	_ <i>_</i>	三 二十8				
		Silver	39.8	_	$\frac{\overline{\varphi}}{\Delta}$				
		Sodium	105	101	;				
	7440-28-0	Thallium	6.0	<u>ا ـــــلاک ا ــ</u> ـا	<u>E</u> ! 188				
	17440-62-2	Vanadium_	10.4	<u> <u> 6</u> </u>	<u>*</u>				
	7440-66-6	Zinc	17500	l_	P				
		Cyanide		_	巫				
		i		I_Il	!				
Color Before:	BROWN	Clari	ty Before:		Texture: MEDIUM				
	YELLOW		ty After:		Artifacts:				
COTOL WITEI!	<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>								
Comments:									
									

REGION VIII SUMMARY OF DATA QUALITY ASSURANCE REVIEW

guideline references are from Contract #787

Case No.: 12334

TDD No.: F08-8909-08

Site: Richardson Flats

Contractor Laboratory: Keystone-Houston

Data Reviewer : Annette Sackman

Date of Review: 10-3-89

Sample Matrix: 5 Low Soils, 15 Low Waters

Analysis: Mercury

Sample Nos.: MHL955, MHL956, MHP500, MHP501, MHP502, MHP503, MHP504,

MHP506, MHP507, MHP509, MHP510, MHP511, MHP512, MHP513,

MHP514, MHP515, MHP516, MHP517, MHP518, MHP519

- (X) Data are acceptable for use.
- () Data are acceptable for use with qualifications noted.
- () Data are preliminary pending verification.
- () Data are unacceptable.

Action required by DPO?

No X Yes The following items require action:

Action required by project officer?

No X Yes

The following are our findings:

All requirements were met for the mercury analysis. No flags were assigned.

Inorganic Data Completeness Checklist

- X Inorganic analysis data (Form I)
- X Initial calibration and continuing calibration verification (Form IIA)

CRDL standard for AA and ICP (Form IIB)

X Blanks (Form III)

ICP interference Check sample (Form IV)

X Spike sample recovery (Form VA)
Post digestion spike sample recovery (Form VB)

- X Duplicates (Form VI)
- X Laboratory control sample (Form VII)
 Standard addition results (Form VIII)
 ICP serial dilutions (Form IX)
- X Holding times (Form X)
- X Instrument detection limits-quarterly (Form XI)
- X ICP interelement correction factors-quarterly (Form II)
- X ICP linear ranges-quarterly (Form XIII)
 Raw data for interference checks
- X Raw data for calibration standards
- X Raw data for blanks
 Raw data for CRI and/or CRA
- X Raw data for samples
- X Raw data for duplicates
- X Raw data for spikes
- X Traffic reports

Contract Compliance

- I. Initial and Continuing Calibration Verification (ICV and CCV) (guidelines pg. E-4, Form IIA)
 - 1. Was instrument calibrated daily and each time it was set up?

 yes X no.
 - 2. Were instruments calibrated using 1 blank and several standards?

 yes X no
 - 3. Were calibration verifications within 90-110%?

 yes X no
 - 4. Were continuing calibrations run at 10% frequency?

 yes X

 no
- 5. Were the raw data correctly transcribed onto Form IIA?

 yes X no

 Comments: All requirements met.
- II. CRDL Standards for ICP (CRI) and/or AA (CRA) (guidelines pg. E-6, Form IIB)
 - 1. For ICP analysis, were standards (CRI) @ 2x the CRDL or the IDL (whichever was greater) analyzed at the beginning and the end of each sample run, or at a minimum of twice/8 hour shift, whichever was more frequent?

yes no

- 2. For furnace AA analysis, were standards (CRA) analyzed at the beginning and the end of each sample run, or at a minimum of twice/8 hour shift, whichever was more frequent?
- 3. Were the CRI and/or CRA standards analyzed after the ICV? yes no
- 4. Were these data reported on Form IIB?

 yes

 no
- 5. Were the raw data correctly transcribed onto Form IIB?

 yes no

 Comments: Not required.

III. Blanks (guidelines pg. E-6, Form III)

- 1. Was the initial calibration blank (ICB) analyzed immediately after the initial calibration verification (ICV)?

 yes X no
- 2. Was a continuing calibration blank (CCB) analyzed immediately after each continuing calibration verification (CCV)?

 yes X no
- 3. Was a preparation blank (PB) analyzed at a frequency of at least 1 in 20 samples?

 yes X no NA
- How many elements were detected above the CRDLs? 0 (if 0, go to question 5)
 - 4a. How many elements were detected in the blanks at greater than one-half the amount detected in any sample?
- 5. Were raw data correctly transcribed onto Form III?

 yes X no

 Comments: All requirements met.
- IV. ICP Interference Checks (ICS) (guidelines pg. E-7, Form IV)
 - Was the ICS analyzed twice per 8 hour shift? yes no
 - 2. Were the ICSs analyzed before and after samples?
 - 3. Was any massive interference detected?

 yes

 no
 - 4. Were the ICSs within $\pm 20\%$ mean value? yes no
- 5. Were raw data correctly transcribed onto Form IV?
 Comments: Not required.

V. Spike Sample Analysis (S) (guideline pg. E-8, Form V)

- 1. Were spikes analyzed at a frequency of 1 in 20 samples?

 yes X no
- Were spike recoveries correctly calculated? yes X no

$$x$$
 recovery = $\frac{(SSR - SR)}{SA}$ X 100

SSR = Spiked Sample Result

SR = Sample Result

SA = Spike Added

- 3. Were spike recoveries within the range of 75-125%? yes X no
 - 3a. For recoveries outside this range, were associated data flagged "N" by the laboratory on Forms I and V?

 yes no NA X
 - (an exception if granted where the sample concentration is >4X the spike concentration)
 - 4. Were raw data correctly transcribed onto Form V?

 yes X no
- * Refer to page E-9 (SOW 787) for information regarding the amount of spike to be added for each analyte and for other information about the Spike Sample Analysis.

Comments: All requirements met.

VI. Duplicates (D) (guidelines pg. E-11, Form VI)

- Were duplicates analyzed at a frequency of 1 in 20 samples? yes X no
- 2. Were RPDs correctly calculated?

 yes X

$$RPD = \frac{S - D}{(S + D)/2} \times 100$$

S = Sample

D = Duplicate

no

- 3a. For sample concentrations >5x the CRDL, were RPDs ±20%? (limits of ±35% apply for soil/sediment/tailings samples)

 yes X no NA
- 3b. For sample concentrations >5x the CRDL, did duplicate analysis results fall outside the control window of ± the CRDL?

 yes no X NA
- 3c. Where the RPDs exceeded the control limits, were the data flagged '*' on Forms I and VI by the laboratory?

 yes no NA
- 4. Were raw data correctly transcribed onto Form VI?

 yes X no
- * Other Considerations:
- Field blanks cannot be used for duplicate analyses
- Duplicates must be analyzed for each analytical method

Comments: All requirements met.

- VII. Laboratory Control Sample (LCS) Analysis (guideline pg. E-12, Form VII)
 - 1. Was an LCS analyzed for every sample delivery group or batch of samples, whichever was more frequent? yes X no
 - 2. Were recoveries within the 80-120% limit?

 yes X no
 - -if the recoveries were outside this range the analysis must be terminated, the problem corrected and the previous samples associated with that LCS redigested and reanalyzed.
 - Were the raw data correctly transcribed onto Form VII? yes X no

Comments: All requirements met.

VIII. Furnace Atomic Absorption (AA) QC Analysis (guidelines pg. E-14, Form VIII)

1. Does the raw data package contain absorbance values for two injections per sample, the average values and the relative standard deviation (RSD)?

yes

no

 For analyte concentrations > the CRDL, did the RSD for the duplicate injections agree within 20%? (if yes, go to question 3)

yes

no

 $RSD = \frac{SD}{M} \times 100$

SD = Standard Deviation of Duplicate Injections

M = Mean of Duplicate Injections

2a. Were samples that exceeded the 20% criteria reanalyzed?

yes

no

2b. Did any reanalyzed samples exceed the 20% criteria? yes no

2c. If yes, did the laboratory flag the data of Form I with an 'M'?

yes

no

Was the recovery of the spike > 40%? (if yes, go to question 4).

yes

no

If no, was the sample diluted and rerun with another spike?

yes

no

4. Was sample absorbance 50% of spike absorbance?* (if yes, go to question 5).

yes

no

* Spike absorbance = absorbance of spiked sample - absorbance of sample.

4a. For spike recoveries between 85 and 115%, were results reported to the IDL?

yes

no

 $RPD = \frac{(SSR - SR)}{SA} \times 100$

SSR = Spike Sample Recovery

SR = Sample Result

SA = Spike Added

- 4b. For spike recoveries outside the 85 and 115% range, were results reported to the IDL and flagged with 'W'?

 yes no
- 5. Was spike recovery between 85 and 115%? (if no, go to question 6)
 - 5a. Were results quantified from calibration curve and reported to IDL?

yes '

no

6. Was an MSA at 50, 100 and 150% of the sample absorbance analyzed?

yes

no

- 6a. Was each MSA analysis identified in the raw data along with the slope, intercept and correlation coefficient? yes no
- 6b. Were these data correctly transcribed onto Form VIII?
 yes no
- 6d. If no, were MSAs run once more?

 yes no
- If the correlation coefficients were still > 0.995, data on Form I must be from the run with the best 'r' and the data on Forms I and VII must be flagged with a '+'.

Were these criteria met?

yes

no

6e. Were all MSA obtained data: marked with an ansist or an Strong form I?

yes

no:

Comments: Not required.

- IX. ICP Serial Dilution (L) Analysis (guidelines pg. E-12, Form IX)
 - 1. Was an ICP serial dilution performed on each group of samples of a similar matrix (i.e., soil, water) and concentration (i.e., low, high) or for each sample delivery group, whichever was more frequent?

yes

no

2. For elements with concentrations >10X the CRDL, did any exceed the serial dilution results by more than 10%? (if no, skip questions 3 and 4)

ves

no

 $% \frac{I-S}{I} \times 100$

I = Initial Sample Result

- S = Serial Dilution Result (instrument reading X5)
- 3. Which elements had concentrations that exceeded the 10% criteria?
- 4. Did the laboratory flag these data with an 'E' on Form IX?

 yes

 no
- 5. Were the raw data correctly transcribed onto Form IX?

 yes

 no

Comments: Not required.

- X. Instrument Detection Limits (IDL) (guidelines pg. E-13, Form XI)
 - 1. Were IDLs reported for each analyzed element?

 yes X no
 - Were IDLs reported for each instrument used?
 yes X no
 - Did the IDLs meet the contract requirements? (refer to pg. E-13, SOW 787)

yes X no

Comments: All requirements met.

- XI. Interelement Corrections for ICP (guidelines pg. E-13, Form XII)
 - 1. Were correction factors reported on Form XII? yes X no

Comments: All requirements met.

- XII. Linear Range Analysis (LRA) (guidelines pg. E-14, Form XII)
 - Was a linear range verification standard analyzed? yes X no
 - 2. Was the results within $\pm 5\%$ of the true value? yes no

Holding Times

Limits: Metals - 6 months; Hg - 30 days; Cn - 28 days.

- Verified date of sample receipt by laboratory 7-21-89
 Date of preparation/analyses 8-3-89
 Were holding times met? yes X no

Analyte	Matrix	Date Sampled	Prep Date	Holding Time	Höldin Limit	•
Mercury Mercury	Low soil Low Water		8-3-89 8-3-89	13 days 13 days		yes yes

U.S. EPA - CLP

Lab Name: Kl	EYSTONE ENVIR		1 ANALYSIS DATA Contract:		EPA SAMPLE NO.
Lab Code:	KEYTX Ca	se No.: 123	334 SAS No.	.	SDG No.: MHL955
Matrix (soi	l/water): SOI	L		Lab Sample	D: 890773003
Level (low/	med): LOW			Date Recei	ived: 07/21/89
% Solids:	98.	3			
			ug/L or mg/kg	dry weight)	: MG/KG
	CAS No.	! Analyte	Concentration	ici a	
	7429-90-5 7440-36-0 7440-38-2 7440-39-3 7440-41-7 7440-43-9 7440-47-3 7440-48-4 7440-50-8 7439-89-6 7439-95-4 7439-95-4 7439-97-6 7439-02-0 7440-09-7 7782-49-2	Aluminum_ Antimony_ Arsenic Barium_ Beryllium Cadmium_ Calcium_ Chromium_ Cobalt_ Copper_ Iron_ Lead_ Magnesium Manganese Mercury_ Nickel_ Potassium Selenium_	0.99		NR NR NR NR NR NR NR NR
Color Before: Color After: Comments:	; ;	Sodium Thallium_ Vanadium_ Zinc Cyanide Clarity		; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	exture:

000007

		u.s.	EPA - CLP		
•		INORGANIC A	1 NALYSIS DATA S	SHEET"	EPA SAMPLE NO.
Lab Name: KE	STONE ENVIR	ONMENTAL	Contract: 6	000-8W-8	MHL956 5
Lab Code: Ki	EYTX Ca	se No.: 123	34 SAS No.:	:	SDG No.: MHL955
Matrix (soil	/water): SOI	L		Lab Samp	le ID: 890773006
Level (low/me	ed): LOW			Date Rec	eived: 07/21/89
% Solids:	. 97.	' 9			
	Concentrati	on Units (u	g/L or mg/kg o	dry weigh	t): MG/KG
•	CAS No.		Concentration	; ; Q	
	7429-90-5 7440-36-0 7440-38-2 7440-39-3 7440-41-7 7440-43-9 7440-47-3 7440-48-4 7440-50-8 7439-92-1 7439-95-4 7439-95-4 7439-97-6 7439-02-0 7440-09-7 7782-49-2 7440-23-5 7440-28-0 7440-66-6	Antimony	1.30		INR
Color Before:		Clarity	Before:		Texture:
Color After:		Clarity	After:		Artifacts:
Comments:					

00008 ecology and environment ecology and environment 7/87

U.S. EPA - CLP

Lab Name: KEYSTONE E		1 ALYSIS DATA SHEET Contract: 68-W8	! MHP500
	Case No.: 12334		SDG No.: MHL955
Matrix (soil/water): Level (low/med):	rom		Received: 07/21/89
% Solids:	98.6		

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	 Analyte	: Concentration	101	Q	: : M :	
: 7429-90-5	Aluminum_	' !	[-]		NR	- ;
	Antimony_		<u> </u>		INR	i
	Arsenic				INR	i
	Barium				INR	ì
	Beryllium		!		INR	Ì
	Cadmium				NR	•
	Calcium				INR	
	Chromium_				INR	Ì
	Cobalt				NR.	Ì
17440-50-8	Copper		i i		NR	!
	IIron		; ;		.NR	;
	Lead				NR	į
	Magnesium				INR	į
	Manganese				NR	į
	!Mercury		: :		CV	į
	Nickel				INR	
	Potassium		. i		NR	į
	Selenium	•	i i		INR	i
	Silver		i i		NR.	i
	Sodium		: :		NR.	i
	Thallium_		: :		NR	i
	'Vanadium_		; ;		NR	į
	:Zinc		: :		INR	i
			: :		NR	í
'		! !			!	ì

Color	Before:	Clarity	Before:	Texture:	
Color	After:	Clarity	After:	Artifacts:	
Commer	nts:				

U.S. EPA - CLP

•		INORGANIC	1 Analysis data	SHFF	т.	EP#	SAMPLE
ah Nama <i>V</i>	EVETONE ENUIS		Contract:				MHP501
ad Name: K	EADININE ENATI	KUMIEN I AL	Contracti	00 -N	18 -000	- ·	
ab Code:	KEYTX Ca	ase No.: 123	334 SAS No.	:		SDG	No.: MH
Matrix (soi	1/water): SO	[L		Lat	Samp	le ID:	890773
_evel (low/	med): LOV	V		Dat	e Rec	eived:	07/21/
% Solids:	. 82.	.4					
	Concentrati	ion Units (ig/L or mg/kg	drv	weich	t): MB	i/KG
							•
	CAS No.		¦ ¦Concentration	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;		; ;	•
			; !	_!_!		-!!	
		Aluminum_		1 1		INR	
	17440-36-0	Antimony_ Arsenic	! !	1 1		INR I	
		Barium		-		INR	
		Beryllium				INR	
		Cadmium				INR	
		Calcium				INR	
		Chromium_				INR	
		Cobalt				INR :	
	17440-50-8	:Copper	·	1 1		INR I	
	17439-89-6	Iron	!			INR :	
		Lead				INR I	
		Magnesium		1 1		INR	
		:Manganese		1 1		INR	
		Mercury		1 1		ICV :	
		Nickel		; ;		INR :	
		Potassium				INR :	
		Selenium_				INR I	
		Silver				INR	
		Sodium				INR	
		!Thallium_		; ;		INR I	
		Vanadium_		i i		INR I	
		Zinc		1 1		INR :	
	1	_!Cyanide _!	 	_		_	
lor Before	:	Clarity	/ Before:			Textu	re:
lor After:		Clarity	/ After:			Artif	acts:
mments:							

00010

ccology and environment 7/87

U.S. EPA - CLP

•	INORGANIC AN	EPA SAMPLE NO.		
Lab Name: KEYSTONE E		•	68-W8-0005	MHP502
Lab Code: KEYTX	Case No.: 1233	34 SAS No.	. :	SDG No.: MHL955
Matrix (soil/water):	SOIL		Lab Sample	ID: 890773009
Level (low/med):	LOW		Date Recei	ved: 07/21/89
% Solids:	92.0			

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	 Analyte 	 Concentration 	: : : C :		 M -	1
:7429-90-5	Aluminum		1 -		INR	١.
17440-36-0			1 1) 	INR	1
17440-38-2			1 1	1	INR	1
17440-39-3			1 1	!	INR	1
17440-41-7			! !		INR	
17440-43-9	•				INR	i
17440-70-2					INR	i
17440-47-3			: i	ł	INR	i
17440-48-4	_			ł	INR	:
17440-50-8	Copper			ł	INR	:
17439-89-6			; ;	<u> </u>	INR	;
17439-92-1				i	INR	i
17439-95-4		! !	: :		INR	i
17439-96-5			: :		INR	i
17439-97-6				!	ICV	i
17439-02-0					INR	i
17440-09-7			: i		INR	i
7782-49-2			: :		INR	i
17440-22-4	_				INR	i
17440-23-5					INR	i
17440-28-0					INR	i
17440-62-2					INR	i
17440-66-6	Zinc		<u> </u>		INR	į
1	Cyanide		: !		INR	i
·	!	<u>'</u>			1	i
	'				_ `	٠.

Color	Before:	Clarity	Before:	Texture:
Color	After:	Clarity	After:	Artifacts:
Commen				

U.S. EPA - CLF

•		INCREANTE	1 ANALYSIS DATA		EPA SAMPLE N
		THURBANIC.	HIMPISTS DWIM	onee i	E059HM
.ab-Name:	KEYSTONE ENVIR	ONMENTAL	Contract:	68-W8-0005	
ab Code:	KEYTX Ca	se No.: 12:	334 SAS No.	:	SDG No.: MHLS
				_	
Matrix (so	il/water): WAT	ER		Lab Sampl	e ID: 89077301
Level (low	/med): LOW	1		Date Rece	ived: 07/21/89
% Solids:	, o				
	Concentrati	on Units (ug/L or mg/kg	dry weight): UG/L
	;			1 1	
	CAS No.	Analyte	Concentration	ici a	! M !
	7429-90-5	Aluminum	 		!! !NR !
	17440-36-0	:Antimony	1 1		INR I
	7440-38-2	Arsenic	•		
	17440-39-3	Barium			INR !
	7440-39-3 7440-41-7	Bervllium			INR I
	17440-43-9				INR I
	17440-70-2				INR I
	17440-47-3			1 1	INR I
	17440-48-4			1 1	INR I
	17440-50-8	Copper	! !		INR I
	17439-89-6	:Iron	!	1 1	INR I
	7439-92-1			 	INR I
	17439-95-4			1 1	INR
	17439-96-5	! Manganese		1 1	INR I
	17439-97-6			:0:	ICV :
	17439-02-0	Nickel	!	1 1	
	17440-09-7	Potassium	,	1 1	INR I
	17782-49-2	Selenium_	1	 	INR :
	17440-22-4			1 1	INR I
	17440-23-5				INR I
	17440-28-0			1 1	INR I
	17440-62-2				INR I
	17440-66-6				INR I
		Cyanide 			INR
	\		'		''
olor Befor	2:	Clarity	y Before:	•	Texture:
olor Af ter	•	Clarity	y After:	ı	Artifacts:
omments:					

000012

U.S. EPA - CLP

•		INORGAN	1 IC ANALYS	IS DATA	SHEET	!	IPLE NO.
Lab Name: KE	EYSTONE EN	IVI RONMENTA	L Con	tract:	68-W8-0005	•	'504
Lab Code: k	(EYTX	Case No.:	12334	SAS No.	:	SDG No.:	MHL955
Matrix (soil	l/water):	WATER			Lab Sample	e ID: 890	773011
Level (low/m	ned):	LOW			Date Recei	ived: 07/	21/89
% Solids:	•	o					•
	Concentr	ation Unit	s (ug/L o	r mg/kg	dry weight:	: UG/L	

17440-36-0 | Antimony_1 17440-38-2 | Arsenic__| INR : |7440-39-3 |Barium___| INR |7440-41-7 |Beryllium| INR I |7440-43-9 |Cadmium__| INR |7440-70-2 |Calcium__| INR 17440-47-3 |Chromium_| 17440-48-4 | Cobalt___| 17440-50-8 | Copper___| :7439-89-6 :Iron____: INR |7439-92-1 |Lead____| INR 17439-95-4 | Magnesium | INR ! :7439-96-5 | Manganese | INR : 17439-97-6 | Mercury__| 0.20 (0) ICV I 17439-02-0 | Nickel___| INR 17440-09-7 | Potassium | INR I INR

Color	Before:	Clarity	Before:	Texture:
Color	After:	Clarity	After:	Artifacts:
Commer	nts:			

!7440-22-4 |Silver___|

17440-23-5 | Sodium___!

17440-28-0 | Thallium_ |

17440-62-2 | Vanadium_ |

|7440-66-6 |Zinc___|

INR

INR

INR

INR

INR I

U.S. EPA - CLP

n - 使物 <mark>機能</mark>が整合性であった。 and company to the company of the company o

Lab Name: KEYSTONE E	INORGANIC ANALYSIS DATA ENVIRONMENTAL Contract:	MHP506
Lab Code: KEYTX	Case No.: 12334 SAS No.	SDG No.: MHL955
Matrix (soil/water):	: WATER	Lab Sample ID: 890773012
Level (low/med):	LOW	Date Received: 07/21/89
% Solids:	0	

Concentration Units (ug/L or mg/kg dry weight): UG/L

			T-T		
CAS No.	Analyte	Concentration		Q	i m
1		 	1_1		_
17429-90-5	Aluminum_		1 1		INR :
17440-36-0	'Antimony_		1 1		INR :
17440-38-2	Arsenic		.1 1		INR :
17440-39-3	Barium	!	! !		INR
17440-41-7	Beryllium	1 1	; ;		INR
17440-43-9	Cadmium	1 i	1 1		INR :
17440-70-2	Calcium	!	; ;		INR
17440-47-3	Chromium_	1	1 1		INR
17440-48-4	Cobalt	;	1 1		INR :
17440-50-8	Copper		1 1		INR :
17439-89-6	Iron	!	1 1		INR
:7439- 9 2-1		}	1 1		INR
17439-95-4	Magnesium	!	1 1		INR :
	:Manganese		; ;		INR
	Mercury		101		ICA I
17439-02-0	Nickel	!	; ;		INR
17440-09-7	·		1 :		INR :
	Selenium_		! !		INR I
17440-22-4	Silver		1 1		INR :
17440-23-5			! !		INR :
	Thallium_		1 1		INR :
	!Vanadium_	•	1 1		INR :
17440-66-6	Zinc		1 1		INR :
;	Cyanide	;	1 1		INR
!	.	!	1_1.		_

Color Before:	Clarity Before:	Texture:
Color After:	Clarity After:	Artifacts:
Comments:		
	﴾ كه شه شه شه شه سه شه شه يين هه بين مي ميه بين بين هه هم هه هي مي بين بين بين بين بين بين بين بين بين بي	

000011nvironment 7/87

U.S. EPA - CLP

•			1 ANALYSIS DATA		EPA SAMPLE NO.
Lab Name:	KEYSTONE ENVIR	ONMENTAL	Contract:	68-W8-0005	
Lab Code:	KEYTX Ca	se No.: 123	34 SAS No.	:	SDG No.: MHL955
Matrix (s	oil/water): WAT	ER		Lab Sampl	e ID: 890773013
Level (lo	w/med): LOW			Date Rece	eived: 07/21/89
% Solids:	. 0				
	Concentrati	on Units (ig/L or mg/kg	dry weight	e): UG/L
					1 !
	ICAS No.	Analyte	Concentration	ici Q	
	7429-90-5		، بده ده که سه سه جه بره خد سه س برو، حد ش	-	INR I
	17440-36-0	_		1 1	INR I
	17440-38-2	Arsenic	;	j 1	INR
	17440-39-3	Barium			INR :
	17440-41-7	Beryllium	1	: :	INR I
	17440-43-9			; ;	INR !
	17440-70-2			; ;	INR
	17440-47-3			: :	INR I
	17440-48-4				INR I
	17440-50-8			1 1	INR I
	17439-89-6			1 1	INR
	17439-92-1			1 1	INR I
	17439-95-4	:Magnesium	;		INR
	7439 <i>-</i> 96 <i>-</i> 5			1 1	INR !
	7439-97-6				ICV
	17439-02-0			!!	INR I
	17440-09-7			i i	INR I
	17782-49-2			• •	INR I
	17440-22-4			i i	INR. I
	17440-23-5				INR I
	17440-28-0				INR I
	17440-62-2			i i	INR I
	17440-66-6			i i	INR I
		Cyanide		i i	INR I
Color Befo			/ Before:		Texture:
Color Afte	r:	Clarity	After:		Artifacts:
Comments:					

000015

INORGANIC ANALYSIS DATA SHEET Lab Name: KEYSTONE ENVIRONMENTAL Contract: 68-W8-0005 Lab Code: KEYTX Case No.: 12334 SAS No.: SDG No.: Matrix (soil/water): WATER Lab Sample ID: 8907 Level (low/med): LOW Date Received: 07/2 % Solids: 0 Concentration Units (ug/L or mg/kg dry weight): UG/L CAS No. Analyte Concentration C: Q M 17429-90-5 Aluminum	509 MHL955
Lab Code: KEYTX	773014
Matrix (soil/water): WATER Level (low/med): LOW Date Received: 07/2 % Solids: 0 Concentration Units (ug/L or mg/kg dry weight): UG/L CAS No. Analyte Concentration C Q M	773014
Level (low/med): LOW Date Received: 07/2 % Solids: 0 Concentration Units (ug/L or mg/kg dry weight): UG/L CAS No. Analyte Concentration C Q M	
% Solids: 0 Concentration Units (ug/L or mg/kg dry weight): UG/L	21/89
Concentration Units (ug/L or mg/kg dry weight): UG/L	
CAS No. Analyte Concentration C Q M 	
_ _ 7429-90-5 Aluminum_	
_ 7429-90-5 Aluminum_	
17429-90-5 [Aluminum_]	
17 TO GO O IMIONY I	
7440-38-2 Arsenic	
17440-39-3 Barium	
!7440-41-7 Beryllium	
7440-43-9 Cadmium	
7440-70-2 Calcium	
7440-47-3 Chromium_	
7440-48-4 Cobalt	
7440-50-8 Copper	
7439-89-6	
7439-92-1 Lead	
7439-95-4 Magnesium	
7439-96-5 Manganese	
7439-97-6 Mercury	
17440-09-7 Potassium	
17782-49-2 Selenium_	
7440-22-4 Silver	
7440-23-5 Sodium	
!7440-28-0	
7440-62-2 Vanadium_	
7440-66-6 Zinc	
Cyanide_	
- - -	
Color Before: Clarity Before: Texture:	
Color After: Clarity After: Artifacts:	
Comments:	

000016

U.S. EPA - CLP

		INORGANIC	1 ANALYSIS DATA	SHEET	EPA SAMPLE NO.
Lab ⁻ Name: KE	EYSTONE ENVIR	DNMENTAL	Contract:	6 8- W8-0005	
Lab Code: k	ŒYTX Ca	se No.: 12:	334 SAS No.	:	SDG No.: MHL955
Matrix (soil	l/water): WAT	ER		Lab Sampl	e ID: 890773015
Level (low/m	ned): LOW			Date Rece	ived: 07/21/89
% Solids:	. 0				
			ug/L or mg/kg		
	CAS No.	 Analyte	Concentration	C Q	: M :
	17429-90-5	:Aluminum ;			
				1 1	INR
	7440-41-7 7440-43-9 7440-70-2	Cadmium	!	1 1	INR INR INR
	7440-47-3 7440-48-4 7440-50-8	Cobalt	<u> </u>	1 1	INR INR INR
	7439-89-6 7439-92-1	:Iron	 	.	INR I
	:7439-95-4 :7439-96-5 :7439-97-6	:Manganese	•	1 1	INR INR ICV
	7439-02-0 7440-09-7	Nickel Potassium	 	; ; ; ;	
	17782-49-2 17440-22-4 17440-23-5	Silver	1	: :	INR INR INR
	17440-28-0 17440-62-2 17440-66-6	Vanadium_			INR INR INR
				_	INR !
Color Before:	i.	Clarity	/ Before:		Texture:
Color After:		Clarity	/ After:		Artifacts:
Comments:					

		u.s.	EPA - CLP		
•		INORGANIC A	1 Analysis data s		EPA SAMPLE NO.
Lab Name: KE	YSTONE ENVIR	ONMENTAL.	Contract: 6	8-W8-0005	MHP511
Lab Code: K	EYTX Ca	se No.: 12:	334 SAS No.:	1	SDG No.: MHL955
Matrix (soil	/water): WAT	ER		Lab Sample	ID: 890773016
Level (low/m	ed): LOW			Date Recei	ved: 07/21/89
% Solids:	, o				
	Concentrati	on Units (ug/L or mg/kg d	dry weight)	: UG/L
	: CAS No.	; ¦ Analvte	: Concentration		; : M :
`.	!	!		. _	
	17429-90-5	:Aluminum			INR I
	17440-36-0	'Antimony_			NR !
	17440-38-2	:Arsenic	i	•	NR I
	17440-39-3	Barıum			NR I
	17440-41-7				
	17440-43-9			· .	NR I
	17440-70-2				NR !
	17440-47-3				
	17440-48-4	Cobalt			NR I
	17440-50-8	Copper			NR !
	. 17439-89-6	ilron			NR !
	17439-92-1			i i i	NR
	17439-95-4			: :	
	17439-96-5			1 1	
	17439-97-6	imercury	0.20		LV i
	17439-02-0				NR I
	17440-09-7 1 778 2-49-2				NR :
					NR I
	17440-22-4 17440-23-5	Silver			NR I
	17440-28-0				NR I
	17440-62-2				NR !
	17440-66-6				NR I
	1,740.00-0				NR I
		1		•	!
Color Before:		Clarity	/ Before:	Т	exture:
Color After:		Clarity	/ After:	A	rtifacts:
Comments:					
		~~~~~~~~			

## U.S. EPA - CLP

• '		THOOCANTO	1	C1 1222	EPA SAMPLE NO.
lab Name V	EVETONE ENUI		ANALYSIS DATA Contract:		MHP512
Lao Name: K	ETSTUNE ENVI	KONMENTAL	Contract:	C000-0w-00	*
Lab Code:	KEYTX C	ase No.: 12	334 SAS No.	:	SDG No.: MHL955
Matrix (soi	1/water): WA	TER		Lab Sample	∍ ID: 890773017
Level (low/	med): LO	Al .		Date Rece	ived: 07/21/ <b>89</b>
% Solids:	. 0				
	Concentrat:	ion Units (	ug/L or mg/kg	drv weight:	): UG/L
			-	, –	
			Concentration		
	7429-90-5	Aluminum	! !	_	'' !NR
	17440-36-0	Antimony_	, 		INR I
	17440-38-2	Arsenic	!		INR I
		Barium		<b>1</b>	INR I
		Beryllium			INR I
		Cadmium		1 1	INR :
	17440-70-2	Calcium	<b>!</b>	1 1	INR :
		!Chromium_		1 1	INR
	17440-48-4	Cobalt	1	1 1	INR :
	17440-50-8	Copper	<b>!</b>	1 1	INR
	17439-89-6	!Iron	!	1 1	INR I
	17439-92-1	!Lead	<b>!</b>	11	INR
		Magnesium		1 1	INR :
	17439-96-5	!Manganese	<del> </del>	1 1	
		Mercury			ICV I
	17439-02-0	Nickel	ŀ		INR I
		Potassium			INR I
		Selenium_			INR I
		Silver			INR I
		Sodium			INR I
		Thallium_			INR I
		Vanadium_	•		INR I
		Zinc			INR I
		Cyanide	<b>i</b> <b>!</b>		INR I I I
Color Before	:	Clarity	Before:		Texture:
Color After:		Clarity	y After:	A	Artifacts:
Comments:	•				
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		، شہ سے سے سے رہے منه سے نہیں ہے رہے من منت علم ہے		

		U.S.	EPA - CLP				
(ab Name: i			1 ANALYSIS DATA S Contract: 6		<b>!</b>		MPLE NO.
cab manar .	\L!\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	OMILITIAL	501101 4001				
Lab Code:	KEYTX Ca	se No.: 12:	334 SAS No.:	1	5	DG No.	: MHL955
Matrix (so:	il/water): WAT	ER		Lab S	ample	ID: 83	90773020
Level (low,	/med): LOW			Date	Receiv	ed: 07	7/21/89
% Solids:	, ο						
	Concentrați	on Units (	ug/L or mg/kg o	iry we	ight):	UG/L	
				7-7	<del></del>	<del></del>	
	ICAS No.	: Analyte	:  Concentration 	101	<b>a</b> : :	м	
	17429-90-5	Aluminum_		-;-;		<del></del>	
	17440-36-0	Antimony_	•		IN		
	17440-38-2	Arsenic	1	1 1	١N	R :	
	17440-39-3	Barium	1	1 1	١N	R !	
	17440-41-7			1 1			
	17440-43-9			1 1	I N		
	17440-70-2			1 1	!N		
	17440-47-3				! N	R!	
	17440-48-4	Cobalt	:	; ;	!N		
	17440-50-8	Copper	<b>.</b>		!N		
	17439-89-6	iron	;	; ;	!N		
	17439-92-1			1 1	iN	R !	
	17439-95-4				IN		
	17439-96-5			 	!N		
	17439-97-6 17439-02-0			1 1	l C		
	17440-09-7			1 1	i N		
	17782-49-2			1 1	i N		
	17440-22-4			1 1	i N		
	17440-23-5	!Sodium	! !	!!	iN		
	17440-28-0			; ;		R i	
	17440-62-2			!!		R I	
	17440-66-6					R i	
		Cyanide				R :	
			!	_i_i		;	
Color Before	<b>:</b>	Clarit	y Before:		Te	xture:	
Color After:	ł	Clarit	y After:		Ar	tifact	:s:
Comments:							
~~~~~~							

recycled paper recycled paper

U.S. EPA - CLP

•			********	1	a====		_	SAMPLE	E NO.
			INORGANIC	ANALYSIS DATA	SHEE		!	MHP514	 L
Lab Na	ame: Ki	EYSTONE EN	VIRONMENTAL	Contract:	6 8 - WE	3-0005	i		
Lab Co	ode:	KEYTX	Case No.: 12	2334 SAS No.	:		SDG I	No.: MH	IL955
Matr	ix (soi	l/water): V	NATER		Lab	Sample	e ID:	890773	8021
Level	l (1 <u>0</u> w/a	ned): l	ΠW		Date	. Recei	ved:	07/21/	'89
% Sol	lids:	٠	0						
		C	. 4.2 11-24 1	Complement of the complement	,-1.e., .	oicht'	. 112	/ 1	
		Concentra	ation units ((ug/L or mg/kg	erry w	erdur.	. 06.	, <u>r</u>	
		;		;			7		
		ICAS No.	Analyte	Concentration	101				
		!	!	.	_!_!_	!			
		17429-90	-5 Aluminum_	-!	!!		NR		
		17440-36	-0 Antimony_ -2 Arsenic	• !					
		17440-38	-2 Arsenic	•!	-1 1		NR I		
			-3 Barium		1 1		NR !		
			-7 Beryllium		1 1		NR !		
			-9 (Cadmium			i	NR !		
			-2 Calcium			:			
			-3 Chromium_		1 1		NR !		
			-4 Cobalt		1 1		NR I		
			-8		; ;		NR I		
		17439-89	-6 Iron	_1	; ;		NR I		
			-1 Lead		1 1		NR I		
			-4 ¦Magnesium		1 1		NR I		
			-5 Manganese		1 1		NR		
			-6 Mercury			i			
			-O Nickel		1 1				
			-7 Potassium				NR I		
			-2 Selenium_		1 1		NR I		
			-4 Silver				NR !		
			-5 Sodium				NR !		
			-O Thallium_		1 1		NR :		
			-2 Vanadium_		1 1		NR :		
			-6	-	1 1		NR I		
			¦Cyanide	_	1 1		NR :		
		İ			-'-'-	ⁱ	'		
Color	Before	:	Clarit	y Before:		7	extu	re:	
Color	After:		Clarit	y After:		A	artif	acts:	
Commer	nts:								

		u.s.	EPA - CLP			•
•		INORGANIC A	1 ANALYSIS DATA S	SHEET	EPA	SAMPLE NO.
Lab Name: Ki	EYSTONE ENVIR	ONMENTAL	Contract: 6	8-W8-00	005	
Lab Code: i	ŒYTX Ca	se No.: 123	34 SAS No.:	1	SDG 1	No.: MHL955
Matrix (soi:	l/water): WAT	ER		Lab San	nple ID:	890773022
Level (low/	ned): LOW			Date Re	eceived:	07/21/89
% Solids:	. 0					
		1	ug/L or mg/kg o	1 1		/ L .
	CAS No.	: Analyte	Concentration		: M :	
	17439-02-0 17440-09-7 17782-49-2 17440-22-4 17440-23-5 17440-28-0 17440-62-2 17440-66-6	Antimony_ Arsenic Barium Beryllium Cadmium Calcium Chromium_ Cobalt Copper Iron Lead Magnesium Manganese Mercury_ Nickel Potassium Selenium_ Silver Sodium Thallium_ Vanadium_ Zinc	0.20		R R R R R R R R R R R R R R R R R R R	
Color Before		Clarity	/ Before:		Textur	re:
Color After:		Clarity	/ After:		Artifa	acts:
Comments:						

Cology and environment 7/87

and the second

U.S. EPA - CLP

•		INORGANIC	1 ANALYSIS DATA	SHEET	EPA SAMPLE NO.
Lab Name:	KEYSTONE EN	IVIRONMENTAL	Contract:	68-W8-0005	
Lab Code:	KEYTX	Case No.: 12	2334 SAS No.	:	SDG No.: MHL955
Matrix (so	oil/water):	WATER		Lab Sample	ID: 890773023
Level (low	v/med):	LOW		Date Recei	ved: 07/21/89
% Solids:	•	0			·
	Concentr	ation Units ((ug/L or mg/kg	dry weight)	: UG/L
	CAS No.	: Analyte	: Concentration	101 0	 M

CAS No.	Analyte	¦ Concentration 	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	 Q 	
17429-90-5	Aluminum_	!	1	}	INR
17440-36-0	_		1 1		INR :
17440-38-2			.1 1		INR :
17440-39-3			: :		INR I
17440-41-7			1 1		INR I
17440-43-9	Cadmium	•	1 ;		INR I
17440-70-2			: :		INR !
17440-47-3	Chromium_	!	1 1		INR :
17440-48-4	Cobalt	!	; ;		INR I
17440-50-8			1 1		INR I
17439-89-6			; ;		INR :
17439-92-1		!	1 1		INR I
17439-95-4	:Magnesium		1 1		INR I
17439-96-5	:Manganese	1	1 1		INR :
17439-97-6			1 1		ICV I
17439-02-0	Nickel		; ;		INR I
17440-09-7	!Potassium	¦	: :		INR I
17782-49-2	Selenium_	!	: :		INR I
17440-22-4	Silver	1	1 1		INR I
17440-23-5	Sodium				INR I
17440-28-0	!Thallium_	<u> </u>	; ;		INR
17440-62-2	Vanadium_	;	; ;		INR
17440-66-6	Zinc	;	: :		INR I
!	Cyanide	}	1 1		INR I
	1	· 	!_!		.!!

Color	Before:	Clarity Before:	Texture:			
Color	After:	Clarity After:	Artifacts:			
Comments:						

		u.s.	EPA - CLP		
		INORGANIC A	1 NALYSIS DATA :	SHEET	EPA SAMPLE NO.
Lab Name: KEY	STONE ENVIR	ONMENTA!	Contract:	58-W8-0005	MHP517
Lab Hame. Kill	010112 211111	011112111772	00,107 aco.		· ·
Lab Code: /KE	YTX Ca	se No.: 123	34 SAS No.	:	SDG No.: MHL955
Matrix (soil/	water): WAT	ER		Lab Sampl	e ID: 890773024
Level (low/me	d): LOW			Date Rece	eived: 07/21/89
% Solids:	, o				
	:CAS No. :	Analyte Aluminum Antimony Arsenic Barium Caryllium Cadmium Calcium Chromium Chromium Cobalt Copper Iron Lead Magnesium Manganese Mercury Nickel Potassium Selenium Sodium Thallium Vanadium	0.20	Q	M
	17440-66-6	Cyanide			INR INR
	1			_	.'!
Color Before:		Clarity	Before:		Texture:
Color After:		Clarity	After:		Artifacts:
Comments:				•	

U.S. EPA - CLP

			1		EPA SAMPLE NO
		INORGANIC A	NALYSIS DATA 9	SHEET	
Lab-Name:	KEYSTONE ENVIR	ONMENTAL	Contract: 6	58-W8-0005	MHP518
Lab Code:	KEYTX Ca	se No.: 123	34 SAS No.:	:	SDG No.: MHL95
Matrix (so	il/water): WAT	ER		Lab Samp	le ID: 890773025
Level (low	/med): LOW	ı		Date Rece	eived: 07/21/89
% Solids:	0				
	C	11		des contraba	-) - UG/I
	Concentrati	on onles (.g/L or mg/kg c		
	(CAS No.		Concentration		
	17409-90-5	 \		-	-:! INR :
	17429-90-5 17440-36-0 17440-38-2	!Antimony !		ii	INR I
	7440-38-2	Arsenic			INR I
	17440-39-3	Barium		1 1	INR I
		Beryllium		1 1	INR I
	17440-43-9			1 1	INR I
	17440-70-2			1 1	INR
	17440-47-3				INR
	17440-48-4			1 1	INR
	17440-50-8			1 1	
	17439-89-6			1 1	
	7439-92-1			1 1	INR I
	17439- 9 5-4			1 1	INR I
	17439-96-5			1.1	INR I
	:7439-97 <i>-</i> 6	!Mercury!	0.20		ICV
	17439-02-0	{Nickel;		1 1	INR I
	17440-09-7			1 1	
	17782-49-2			1 1	
	17440-22-4	Silver		1 1	INR I
	17440-23-5	Sodium		1 1	INR I
		Thallium_		: :	INR I
	17440-62-2			: :	INR I
		Zinc		1 1	INR
		Cyanide		1 1	INR I
Color Before	· 2:	Clarity	Before:	· · - ·	Texture:
Color After	•	Clarity	After:		Artifacts:
		,			
Comments:					

U.S. EPA - CLP	
1 INORGANIC ANALYSIS DATA	EPA SAMPLE NO
•	: MHP519
Lab Name: KEYSTONE ENVIRONMENTAL Contract:	68-W8-0005 :
Lab Code: KEYTX Case No.: 12334 SAS No	SDG No.: MHL95
Matrix (soil/water): WATER	Lab Sample ID: 890773026
Level (low/med): LDW	Date Received: 07/21/89
% Solids: O	
Concentration Units (ug/L or mg/kg	dry weight): UG/L
CAS No. Analyte Concentration	on Ci Q i M i
	- NR
17440-36-0 Antimony_	I I INR I
!7440-38-2 !Arsenic!	_1
7440-39-3 Barium	II INR I
!7440-41-7 Beryllium	I I INR I
7440-43-9 Cadmium	I INR I
7440-70-2 Calcium	I I INR I
17440-47-3 Chromium_	I INR I
!7440-48-4 Cobalt	I I INR I
17440-50-8 Copper	I I INR I
17439-89-6 Iron	I I INR I
7439-92-1 Lead	I INR I
:7439-95-4 :Magnesium:	! ! INR !

17439-96-5 | Manganese | INR I 17439-97-6 |Mercury__| 0.20 (0) ICV I 17439-02-0 | Nickel___ | INR I 17440-09-7 |Potassium| INR I |7782-49-2 |Selenium_| INR I |7440-22-4 |Silver___| INR : |7440-23-5 |Sodium___| INR I 17440-28-0 | Thallium_ | INR I

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

17440-62-2 | Vanadium_ |

|7440-66-6 |Zinc____|

INR I

INR I

REGION VIII SUMMARY OF DATA QUALITY ASSURANCE REVIEW ***guideline references are from Contract #787***

Case No.: 12334 TDD No.: F08-8909-08

Site: Richardson Flats

Contractor Laboratory: Silver Valley Labs

Data Reviewer: Annette Sackman Date of Review: 10-3-89

Sample Matrix: 5 Low Soils, 15 Low Waters

Analysis: Metals plus Mercury

Sample Nos.: MHL955, MHL956, MHP500, MHP501, MHP502, MHP503, MHP504, MHP506, MHP507, MHP509, MHP510, MHP511, MHP512, MHP513, MHP514, MHP515, MHP516, MHP517, MHP518, MHP519

- () Data are acceptable for use.
- (X) Data are acceptable for use with qualifications noted.
- () Data are preliminary pending verification.
- () Data are unacceptable.

Action required by DPO?

No X Yes The following items require action:

Action required by project officer?

No X Yes

The following are our findings:

These samples were originally sent to Keystone-Houston Labs for metal analysis; however, due to contractual problems, Keystone Houston only analyzed for mercury and then sent the samples to Silver Valley Labs for complete metal analysis. This package is the results for the analysis performed by Silver Valley Labs and includes metals plus mercury analysis. Since the samples were first sent to Keystone-Houston Labs, the holding times for the mercury analysis performed by Sliver Valley Labs was missed by seven days. Therefore, all mercury values in this package are flagged "J" and considered estimate.

The remaining data is acceptable for use with the following qualifications:

No final CRDL standard was run for the furnace AA analysis. The CRDL value for selenium was transposed on Form IIB and the correct %D is 78.6%; however, no qualifications are required for these discrepancies.

The spike recovery was below 40% for selenium values for water matrix (22.8%); therefore, all associated selenium values are unusable and rejected "R". The thallium spike recovery for soil matrix was low (54.3%); therefore all thallium soil values are flagged "J" and considered biased low.

Duplicate results for lead water values obtained by ICAP were high (37.0%RPD). Since sample MHP516 was the only water sample in which lead was analyzed by ICAP, this lead value is considered estimated and flagged "J".

All MSA criteria were followed except for the following: MSA was required for arsenic for sample MHP517 and thallium for sample MHP516; therefore these values are estimated and flagged "J". One correlation coefficient was <0.995 for the arsenic analysis for sample MHP518; therefore, this value is flagged "J", estimated. Both correlation coefficients were <0.995 for the arsenic analysis for sample MHP504; therefore this value is unusable and flagged "R", rejected.

Serial dilution results for arsenic and zinc soil values were slightly high, 12.1% and 13.3 %, respectively. These soil values are therefore flagged "J", estimated.

The arsenic value for sample MHP516 was analyzed by furnace AA and reported as 46.5 μ g/l; however, this number was not multiplied by the dilution factor of 50. The correct arsenic value is actually 2326 μ g/l for this sample.

Inorganic Data Completeness Checklist

- X Inorganic analysis data (Form I)
- X Initial calibration and continuing calibration verification (Form IIA)
- X CRDL standard for AA and ICP (Form IIB)
- X Blanks (Form III)
- X ICP interference Check sample (Form IV)
- X Spike sample recovery (Form VA)
- X Post digestion spike sample recovery (Form VB)
- X Duplicates (Form VI)
- X Laboratory control sample (Form VII)
- X Standard addition results (Form VIII)
- X ICP serial dilutions (Form IX)
- X Holding times (Form X)
- X Instrument detection limits-quarterly (Form XI)
- X ICP interelement correction factors-quarterly (Form II)
- X ICP linear ranges-quarterly (Form XIII)
- X Raw data for interference checks
- X Raw data for calibration standards
- X Raw data for blanks
- X Raw data for CRI and/or CRA
- X Raw data for samples
- X Raw data for duplicates
- X Raw data for spikes
- X Traffic reports

Contract Compliance

- I. Initial and Continuing Calibration Verification (ICV and CCV) (guidelines pg. E-4, Form IIA)
 - Was instrument calibrated daily and each time it was set up? yes X no
 - Were instruments calibrated using 1 blank and several standards? yes X no
 - 3. Were calibration verifications within 90-110%? yes X no
 - 4. Were continuing calibrations run at 10% frequency?

 yes X

 no
- 5. Were the raw data correctly transcribed onto Form IIA?

 yes X no

 Comments: All requirements met.
- II. CRDL Standards for ICP (CRI) and/or AA (CRA) (guidelines pg. E-6, Form IIB)
 - 1. For ICP analysis, were standards (CRI) @ 2x the CRDL or the IDL (whichever was greater) analyzed at the beginning and the end of each sample run, or at a minimum of twice/8 hour shift, whichever was more frequent?

yes X no

- For furnace AA analysis, were standards (CRA) analyzed at the beginning and the end of each sample run, or at a minimum of twice/8 hour shift, whichever was more frequent?
 yes no X
- 3. Were the CRI and/or CRA standards analyzed $\frac{\text{after}}{\text{no}}$ the ICV?
- 4. Were these data reported on Form IIB?

 yes X no
- yes no X
 Comments: The CRA was run only at the beginning of the sample runs and not at the end. The selenium CRDL value was transposed on Form IIB and the correct %D is 78.6%. No flags are required for these discrepancies.

Were the raw data correctly transcribed onto Form IIB?

Blanks (guidelines pg. E-6, Form III)

- Was the initial calibration blank (ICB) analyzed immediately after the initial calibration verification (ICV)? yes X no
- Was a continuing calibration blank (CCB) analyzed immediately after each continuing calibration verification (CCV)? yes X
- Was a preparation blank (PB) analyzed at a frequency of at least 1 in 20 samples? NA yes X no
- How many elements were detected above the CRDLs? 0 (if 0, go to question 5)
 - How many elements were detected in the blanks at greater than one-half the amount detected in any sample?
- 5. Were raw data correctly transcribed onto Form III? yes X Comments: All requirements met.

ICP Interference Checks (ICS) (guidelines pg. E-7, Form IV)

- Was the ICS analyzed twice per 8 hour shift? yes X
- 2. Were the ICSs analyzed before and after samples?
- Was any massive interference detected? no X yes
- 4. Were the ICSs within $\pm 20\%$ mean value? yes X no
- 5. Were raw data correctly transcribed onto Form IV? Comments: All requirements met.

V. Spike Sample Analysis (S) (guideline pg. E-8, Form V)

- 1. Were spikes analyzed at a frequency of 1 in 20 samples?

 yes X no
- 2. Were spike recoveries correctly calculated?

 yes X no

$$% recovery = \frac{(SSR - SR)}{SA} \times 100$$

SSR = Spiked Sample Result

SR = Sample Result

SA = Spike Added

- 3. Were spike recoveries within the range of 75-125%? yes no X
 - 3a. For recoveries outside this range, were associated data flagged "N" by the laboratory on Forms I and V? yes X no NA
 - (an exception if granted where the sample concentration is >4X
 the spike concentration)
 - 4. Were raw data correctly transcribed onto Form V?

 yes X no
- * Refer to page E-9 (SOW 787) for information regarding the amount of spike to be added for each analyte and for other information about the Spike Sample Analysis.

Comments: Selenium water values are unusable and flagged "R" due to spike recoveries below 40% (22.8%). Thallium soil values are estimated and flagged "J" due to low spike recoveries (54.3%).

VI. Duplicates (D) (guidelines pg. E-11, Form VI)

- 1. Were duplicates analyzed at a frequency of 1 in 20 samples? yes \mathbf{X} no
- 2. Were RPDs correctly calculated?

 yes X no

$$RPD = \frac{S - D}{(S + D)/2} \times 100$$

S = Sample

D = Duplicate

- 3a. For sample concentrations >5x the CRDL, were RPDs ± 20 X? (limits of ± 35 X apply for soil/sediment/tailings samples) yes no X NA
- 3b. For sample concentrations >5x the CRDL, did duplicate analysis results fall outside the control window of ± the CRDL?

 ves no X NA
- 3c. Where the RPDs exceeded the control limits, were the data flagged '*' on Forms I and VI by the laboratory?

 yes X no NA
- 4. Were raw data correctly transcribed onto Form VI?

 yes

 no X
- * Other Considerations:
- Field blanks cannot be used for duplicate analyses
- Duplicates must be analyzed for each analytical method

Comments: The selenium values for water sample MHP503D was done on ICAP and was compared to the furnace AA value for MHP503 which gave an RPD of 200%. The ICAP value for MHP503 of 28.02 µg/l, which should have been used for comparison, gives a new RPD of 27.8%. Since no water samples were analyzed by ICAP no flags are assigned to selenium values. Duplicate results for arsenic and lead water samples were high when analyzed by ICAP (200% and 37.0%, respectively). No arsenic values were acquired by ICAP analysis but the lead value for sample MHP516 was analyzed by ICAP and is therefore estimated and flagged "J".

- VII. Laboratory Control Sample (LCS) Analysis (guideline pg. E-12, Form VII)
 - 1. Was an LCS analyzed for every sample delivery group or batch of samples, whichever was more frequent?

 ves X no
 - 2. Were recoveries within the 80-120% limit? yes X no

-if the recoveries were outside this range the analysis must be terminated, the problem corrected and the previous samples associated with that LCS redigested and reanalyzed.

3. Were the raw data correctly transcribed onto Form VII? yes X no

Comments: All requirements met.

VIII. Furnace Atomic Absorption (AA) QC Analysis (guidelines pg. E-14, Form VIII)

1. Does the raw data package contain absorbance values for two injections per sample, the average values and the relative standard deviation (RSD)?

yes X no

 For analyte concentrations > the CRDL, did the RSD for the duplicate injections agree within 20%? (if yes, go to question 3)

yes X no

 $RSD = \underbrace{SD}_{M} X 100$

SD = Standard Deviation of Duplicate Injections

M = Mean of Duplicate Injections

- 2a. Were samples that exceeded the 20% criteria reanalyzed?

 yes

 no
- 2b. Did any reanalyzed samples exceed the 20% criteria? yes no

yes no

3. Was the recovery of the spike > 40%? (if yes, go to question 4).

yes no X

If no, was the sample diluted and rerun with another spike?

yes X no

4. Was sample absorbance >50% of spike absorbance?* (if yes, go to question 5).

yes no X

* Spike absorbance = absorbance of spiked sample - absorbance of sample.

4a. For spike recoveries between 85 and 115%, were results reported to the IDL?

yes X no

 $RPD = \frac{(SSR - SR)}{SA} \times 100$

SSR = Spike Sample Recovery

SR = Sample Result

SA = Spike Added

- 4b. For spike recoveries outside the 85 and 115% range, were results reported to the IDL and flagged with 'W'? yes \overline{X} no
- Was spike recovery between 85 and 115%? (if no, go to question 6)
 - 5a. Were results quantified from calibration curve and reported to IDL?

yes X no

6. Was an MSA at 50, 100 and 150% of the sample absorbance analyzed?

yes no X

- 6a. Was each MSA analysis identified in the raw data along with the slope, intercept and correlation coefficient? yes X no
- 6b. Were these data correctly transcribed onto Form VIII?

 yes

 no
- 6c. Were correlation coefficients(r) > 0.995?

 yes no X
- 6d. If no, were MSAs run once more?

 yes X no
- If the correlation coefficients were still > 0.995, data on Form I must be from the run with the best 'r' and the data on Forms I and VII must be flagged with a '+'.

Were these criteria met?

yes X

no

6e. Were all MSA obtained data marked with an 'S' or an S+ on form I?

yes X no

Comments: MSA was required but not performed for sample MHP516's thallium value or for sample MHP517's arsenic value. These values are estimated and flagged "J". One correlation coefficient was <0.995 for sample MHP518's arsenic value and is flagged "J", estimated. Both correlation coefficients were <0.995 for sample MHP504's arsenic value and is considered unusable and flagged "R", rejected.

- IX. ICP Serial Dilution (L) Analysis (guidelines pg. E-12, Form IX)
 - 1. Was an ICP serial dilution performed on each group of samples of a similar matrix (i.e., soil, water) and concentration (i.e., low, high) or for each sample delivery group, whichever was more frequent?

yes X no

2. For elements with concentrations >10% the CRDL, did any exceed the serial dilution results by more than 10%? (if no, skip questions 3 and 4)

yes X no

% difference = $\frac{I - S}{I}$ X 100

I = Initial Sample Result

S = Serial Dilution Result (instrument reading X5)

- 3. Which elements had concentrations that exceeded the 10% criteria? For soils, arsenic and zinc.
- 4. Did the laboratory flag these data with an 'E' on Form IX?

 ves X no
- 5. Were the raw data correctly transcribed onto Form IX? yes X no

Comments: For the soil samples, the arsenic and zinc values are flagged "J", estimated due to slightly high %D's of 12.1 and 13.3%, respectively.

- X. Instrument Detection Limits (IDL) (guidelines pg. E-13, Form XI)
 - 1. Were IDLs reported for each analyzed element?

 yes X no
 - Were IDLs reported for each instrument used? yes X no
 - Did the IDLs meet the contract requirements? (refer to pg. E-13, SOW 787)

yes X no

Comments: All requirements met.

- XI. Interelement Corrections for ICP (guidelines pg. E-13, Form XII)
 - 1. Were correction factors reported on Form XII?

 yes X no

Comments: All requirements met.

- XII. Linear Range Analysis (LRA) (guidelines pg. E-14, Form XII)
 - 1. Was a linear range verification standard analyzed? yes X no
 - 2. Was the results within $\pm 5\%$ of the true value? yes no

Holding Times

Limits: Metals - 6 months; Hg - 30 days; Cn - 28 days.

- 1. Verified date of sample receipt by laboratory 8-16-89
- 2. Date of preparation/analyses 8-25-89
- 3. Were holding times met? yes no X

Mercury holding times were not met; therefore, all mercury values are estimated low and flagged "J".

Analyte	Matrix	Date Sampled	Prep Date	Holding Time	Holding Time Limit/Met
Mercury Mercury Metals Metals	Low soil Low water Low soil Low water	7-18-89 7-18-89	8-25-89 8-25-89 8-25-89 8-25-89	37 days 37 days 37 days 37 days	30 days no 30 days no 6 months yes 6 months yes

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC. Contract: 66

Lab Code: SILVER Case No.: 12334

SAS No.:41349

SDG No.: MHL955

Matrix (soil/water): SOIL

Lab Sample ID:

Level (low/med): LOW

Date Received: 08/16/89

% Solids:

98.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	: Analyte	: Concentration:	C	0	i : M	;
	i		!	<u></u> .	 · 	i •
Z429-90-5_	: <u>Aluminum_</u> :	691		*	 <u> </u>	;
<u>7440-36-0</u>	<u> Antimony_</u>	63.1			LP_	!
<u>7440-38-2</u>	'Arsenic	220_	!!		 EP_	178
7440-39-3	Barium	153_		*	 LP_	i
7440-41-7	Beryllium	0.22	ַטַ :		 12	:
7440-43-9	Cadmium	21.1	_		 LP_	;
7440-70-2	Calcium	37000			 ۱ ۲	<u> </u>
7440-47-3	Chromium	2.0	: B		 I P	;
	Cobalt		B		 P	:
	Copper	149	· · ·		 iP	i I
7439-89-6	Iron	44700	!		 P	ł i
7439-92-1	Lead	2580	!		 I P	1 1
	Magnesium				 P	
	Manganese				 P	
7439-97-6	Mercury_		W	D W	 	B4-12/84
	Nickel	8.2	X		; P	, 7 }
7440-09-7	Potassium		B		 7 2	?
7782-49-2	Selenium	23.6	!		 F	:
7440-22-4	Silver	12.6		*	 P	}
7440-23-5	Sodium	22.4	B		 P	!
7440-28-0	Thallium	6.6		NS	 F	EK T
	:Vanadium		В		 P	1
	Zinc	3220			 i P	!
	Cyanide	Tagge dates (and the control of the		_ ==	 INR	
	* That I had been been and the continuous and the c	*			 	!

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

INDREANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC.

Contract: 68-09-00

Case No.: 12334

SAS No.: 4-349

SDG No.: MHL955

matrix (soil/water): SOIL

Lab Sample ID:

Level (low/med):

Lab Code: SILVER

LOW

Date Received: 08/16/89

% Solids:

98.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	ci	Q	İM	
t 1	1		- [:
17429-90-5	Aluminum	1040	-1	*	; P	_ 1
17440-36-0	Antimony	84.4	1		; P	_ ;
	Arsenic	208			; P	_:TX8
17440-39-3		86.9		*	; p	
	Beryllium		UI		I P	•••
	Cadmium	41.2			i P	_ ;
	Calcium	54500			; P	_
	Chromium	6.0			; P	- }
	Cobalt		BI	, que um dup .	I P	-
	Copper	205	;	, ,	; P	
	:Iron	36500		- 4m 4m 4m	; P	;
	Lead	3060		- 444	; P	-
	Magnesium				I P	
17439-96-5				· ·		
	Mercury	1,4 7.0	. 7	N J	45:C	DC 94289
	Nickel	9.4			1 P	
	Potassium		BI		; P	***
17782-49-2	Selenium	12.7	1 7		TF.	
17440-22-4	Silver	18.5		*	I P	
	Sodium		BI	,	i P	
	Thallium			NS	F	
	:Vanadium		В		; P	
	:Zinc		====		i P	
	Cyanide		- †	- =	İN	-
	: =	`				
	· -, -, -,		· '			· ·

Color Before: BROWN

Clarity Before:

FORM I - IN

Texture:

Color After: YELLOW

Clarity After:

Artifacts:

INDRGANIC ANALYSIS DATA SHEET

68-W8.0074 1

Lab Name: SILVER VALLEY LABS., INC. Contract: 68-09-0071

Lab Code: SILVER Case No.: 12334

SAS No.: 41784

SDG No.: MHL955

Matrix (soil/water): SOIL

Lab Sample ID:

Level (low/med): LOW

Date Received: 08/16/89

% Solids:

99.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	 Analyte	 Concentration	C		Q M	!
7429-90-5	Aluminum	1530		*	{ }	
7440-36-0	Antimony	87.0	:		; P	}
7440-38-2	Arsenic	222	_]		; P	J 48
7440-39-3	Barium	32.8	8	*	<u> [P</u>]	· -
7440-41-7	Beryllium		ָּטַ וּ		P	¦
7440-43-9	Cadmium	95.9			; P	
7440-70-2	(Calcium	68200			[P	•
7440-47-3	Chromium	8.8	;]		l P	}
7440-48-4	Cobalt	7.4	B		[P	;
7440-50-8	Copper	336			; P	,
7439-89-6	Iron	53400	!		; P _ :	. •
7439-92-1	Lead	4520	1		I P	}
7439-95-4	Magnesium	23000	-		P	}
7439-96-5	Manganese	2320	!		; P	_
	Mercury	1.1	;	1	J&S:CV	99-1289
	Nickel !		B		; P	470
7440-09-7	Potassium	827	8	-,	ا جا ا	•
	Selenium	19.2	;		; F	;
7440-22-4	Silver	22.1	:]	*	P_	
	Sodium	42.6	B			_
7440-28-0	Thallium	4.2	B	N	;F	了料
7440-62-2	Vanadium	3.7	B		IP :	
7440-66-6	Zinc	14100		E	[P	
	Cyanide :		<u> </u>		INR	!

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

68-M8-0074

MHP501

Lab Name: SILVER VALLEY LABS., INC.

Lab Code: SILVER Case No.: 12334

·

SAS No .: (4)47

SDG No.: MHL955

Matrix (soil/water): SOIL

Lab Sample ID:

tevel (low/med):

LOW

Date Received: 08/16/89

% Solids:

81.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

				as as		
1040 11				_		\$
ICAS No.	: Analyte	Concentration	ilii	Q	: M	i
17420 22 5			; <u>;</u>		<u> </u>	i :
17429-90-5		1030	<u> </u>		LP_	i
1 <u>7440-36-0</u>			<u>. – i</u>		12	
	Arsenic	259_	-	- 	<u> </u>	EA T
	Barium	117_			<u>: P</u> _	! !
<u> </u>	Beryllium		: <u>U</u>		<u>: P_</u>	f •
: <u>7440-43-9</u>	:Cadmium	117			<u> </u>	;
17440-70-2	Calcium	5400	1 _ 1		<u> </u>	;
17440-47-3	:Chromium_	0.69	ا ل ا		<u>: P</u>	1
17440-48-4	Cobalt		B		P	;
	Copper	281	!		P	1
17439-89-6	Iron	97400	;		; P	1
	Lead	9300	;		; P	;
17439-95-4	Magnesium		; <u>B</u>		12	i
17439-96-5	<u>Manganese</u>	212	! _ !		12	٠. م
17439-97-6	Mercury	Y.3 1.7		SYT N	€CV	DC 189
17440-02-0	Nickel	5.1	B		IP_	;
17440-09-7	Potassium	1140	18		<u> </u>	:
17782-49-2	Selenium	45.7	1		F	;
17440-22-4	Silver	62.8	: - :		1 2	}
17440-23-5			B		; P	!
	Thallium		B			BATE:
	Vanadium	2.6	B		I P	1
17440-66-6			1		P	1
	Cyanide		-		INR	:
·	. = 4 = 4 = 4 = 1 = 1	`	!		<u></u>	!
·			· '			•

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After:

YELLOW

Clarity After:

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

4-W8-0074

Lab Name: SILVER VALLEY LABS...INC. Contract: 68-09-0071

Lab Code: SILVER Case No.: 12334 SAS No.: 4478

SDG No.: MHL955

Matrix (soil/water): SOIL

Lab Sample ID:

Level (low/med): LOW

Date Received: 08/16/89

% Solius:

95.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

(· ·		, ,		·	,
CAS No.	Analyte	Concentration		Q	, M	1 1 1
7429-90-5	' Aluminum	240			- ¦ =-	1
		144	' -÷		- <u>†</u> -	
	Antimony_	i	,		P	,
	Arsenic		1			TAS
	Barium		BT	*	<u>i_P</u> _	1
7440-41-7	Beryllium		i Li		<u>:P</u> _	;
17440-43-9_	Cadmium	:2 <u>50_</u> :	1_1		<u>1P</u>	i
17440-70-2	:Calcium	32800	<u> </u>		12	1
7440-47-3	Chromium_	:0.59_	; <u>⊓ ;</u>		<u>;P_</u>	;
17440-48-4	:Cobalt	:3.2_	B		<u> </u>	ł i
17440-50-8	Copper	265	1_1		<u> </u>	
17439-89-6	:Iron	87000	1 1		; P	i
7439-92-1	Lead	31600	III		I P	i
17439-95-4	Magnesium	142	BL		<u> : P</u>	}
17439-96-5	Manganese		1		i P	
17439-97-6	Mercury	42 30		N I	SICY	861419
17440-02-0	Nickel	i <u>6.2</u>	<u> 19</u>		<u> </u>	•
17440-09-7	Potassium	680	B		; P	!
17782-49-2	Selenium	38.4	1 1		:F	! !
17440-22-4	Silver	115	ı - T	*	; P	!
17440-23-5	Sodium	117	BĪ		P)
17440-28-0	Thallium	6.8	BI	N	TE	EXT :
17440-62-2	Vanadium	0.57	l U I		P	1
17440-66-6	Zinc	33800	1	E	; P	}
!	Cyanide		1		INR	;
					1	}
~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~						

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Contract: 62-03-0071

Lab Name: SILVER VALLEY LABS., INC.

Lab Code: SILVER

Case No.: 12334

SAS No.:

SDG No.: MHL955

Matrix_(soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

	~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~					
CAS No.	 Analyte	¦ Concentration	l Çi	Q	i im	, , ,
! !	! !				!	;
17429-90-5	Aluminum_	<u> 26.6</u>	B	 - 	12_	:
17440-36-0	Antimony	19.9	<u>. ឬ</u>		12_	;
17440-38-2	Arsenic	3.3	<u>B</u>	NW	LE_	:
17440-39-3	Barium	51.5	B		12_	i
7440-41-7	Beryllium	1.1	<u>U</u>		<u>P</u>	:
17440-43-9	Cadmium	2.0	B	l	<u> </u>	1
17440-70-2	Calcium	147000	!		; P	:
17440-47-3	Chromium	2.8	١Ū		P	;
17440-48-4	Cobalt	2.6	١Ü		; P	!
17440-50-8	Copper		B		; P	:
17439-89-6	Iron	195	!		IP_	;
:7439-92-1	Lead	5.9	B	N*	TF.	1
:7439-95-4	Magnesium		-		I P	1
	: Manganese				P	1
17439-97-6	Mercury	0.2 20	ָּעַ :	28T ~	<u>ICV</u>	PG-11-89
17440-02-0	:Nickei	: <u>9.7</u>	<u>ا پا</u>		<u>: P</u> _	;
17440-09-7	Potassium	2090	B	l 	.P_	1 - 1-
17782-49-2	Selenium	1.4	Щ.	N*	IF_	: X XX
17440-22-4	Silver	1.6	١ <u>U</u>		<u> </u>	;
17440-23-5	Sodium	25200	!		16	;
17440-28-0	Thallium	1.0	١Ų.		IF_	1
17440-62-2	<u> Vanadium</u>	! <u>2.7</u>	١Ù	L	1 P	!
17440-66-6	Zinc	419			12	1
1	Cyanide		!		INR	1
	t 	 	t	l I	!	:

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

INORGANIC ANALYSIS DATA SHEET

68-W8-0074 Contract: 63 D9 067

100

Lab Name: SILVER VALLEY LABS., INC.

SAS No.: 44349

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

cavel (low/med): LOW

Lab Code: SILVER Case No.: 12334

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

			!	i 	- 	!
CAS No.	Analyte	Concentration			M	* : *
7429-90-5	Aluminum	75.8	<u>.</u> Β.	<u> </u>	<u> </u>	i i
7440-36-0	Antimony	19.9	<u>الا</u> :] 	<u>: P</u>	2 20
7440-38-2	Arsenic	5.6	8	<u>int</u>	.≟E_	PK X
7440-39-3	Barium :	52.5	! <u>B</u> .	; ;	<u> ; P</u>	;
7440-41-7	Beryllium:	1.1	١ <u>U</u> .	1 1	<u> </u>	;
7440-43-9	Cadmium_		<u>B</u>	<u> </u>	<u> </u>	:
7440-70-2	Calcium	147000	!		12	:
7440-47-3	Chromium !	2.8	: ឬ	<u> </u>	12	:
7440-48-4	Cobalt		: B		<u> </u>	1
7440-50-8	Copper :	5.6	: B	<u> </u>	<u>:P</u>	1
7439-89-6	Iron	481	¦	<u> </u>	<u>: P</u>	!
7439-92-1	Lead	35.8	<u> </u>	INS*	; F_	;
7439-95-4	<u>Magnesium</u>	36200	١	! !	<u> </u>	:
7439-96-5	<u>Manganese</u>	240	١	!	12	1
7439-97-6	Mercury	0.2 %	<u>: U</u>	KIM	31CY	4-1-89
7440-02-0	Nickel	9.7	١Ų.	1	18	441.0
7440-09-7	Potassium	1920	; ₿	<u> </u>	18	1
7782-49-2	Selenium	14.0	ָטַ ו	¦N∗	<u>:E</u>	RAS
7440-22-4_1	Silver	1.6	ı U	<u> </u>	<u>: P</u> _	i
7440-23-5	Sodium	24100	l	<u> </u>	<u>:P</u> _	}
7440-28-0	Thallium :	1.0	i <u>U</u>	<u>: W</u>	:E_	;
7440-62-2	<u>Vanadium</u>	2.7	١ <u>Ų</u>	<u> </u>	<u>:P</u> _	! !
7440-66-6	Zinc :	519	!	<i>!</i>	<u>: P</u>)
	Cyanide		!	! !	LNR	!
	 	 	!	! 	. !	;

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC.

Contract: 68-09-0071

MHP506

Lab Code: SILVER

Case No.: 12334

SAS No.:

91384

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

						1
CAS No.	: Analyte	 Concentration 	C	Q	i IM I	i
7429-90-5	Aluminum	24.6	B		P	, 1 1
17440-36-0	Antimony	19.9	U		; P	ł I
17440-38-2	Arsenic	6.8	B	NW	:F	<u> </u>
7440-39-3	Barium	54.6	8		; P	:
7440-41-7	Beryllium	1.1	ָנַטַ וּ		i P	:
7440-43-9	Cadmium	1.8	<u>ان</u> ا		; P	;
7440-70-2	Calcium	139000	1 _ 3		; P	;
17440-47-3	Chromium	2.8	: עַ		i P	:
17440-48-4	Cobalt	2.6	В		<u> P</u>	;
17440-50-8	Copper	2.9	B		1P	!
17439-89-6	Iron	338	l _]		<u>: P</u>	:
17439-92-1	Lead	6.2	!	N*	;E_	;
17439-95-4	Magnesium	34600	_]		; P_	<u> </u>
17439-96-5	:Manganese	274			; p	}-c
	Mercury	0.2 2.0	<u>اں</u> :	失「大	31 CV	9-11-89
17440-02-0	Nickel		<u>ں</u> :		12	} 7.77
1 <u>7440-09-7</u>	<u>Potassium</u>	1790	B.		<u> </u>	ļ
17782-49-2	Selenium	14.0	ַ עַ	N*	; F_	84 X
17440-22-4	Silver	1.6	ַ עַ		12_	1
17440-23-5	Sodium	22900_	}		18	;
17440-28-0	:Thallium	1.0	: עַ	W	1F	i F
<u> </u>	' <u>Vanadium</u>	2.7	ָטַ וּ		12	t i
17440-66-6	Zinc	429	1		<u>; P</u>	¦
	Cyanide		!		INR	:
	! !	 	! _) }	· !	ŀ

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After:

COLORLESS

Clarity After: CLEAR

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC. Contract: 63-03-0071

Lab Code: SILVER Case No.: 12334

SAS No.: DC 18

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med): LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

						,
CAS No.	: Analyte	: Concentration 	: : : C	Q	i M !	; ;
17429-90-5	Aluminum	370	:		-;] •
	Antimony	19.9	: UT		; P	}
17440-38-2	Arsenic	12.2		NS	_;F_	!
17440-39-3	Barium_	59.1	81		; P	!
17440-41-7	:Beryllium	1.1	<u> </u>] P	;
17440-43-9	Cadmium	1.8	<u> </u>		12	
17440-70-2	:Calcium	144000			<u> </u>	;
17440-47-3	Chromium	2.8	Bi		IP_	i
17440-48-4	:Cobalt	2.6	<u>: U:</u>		IP_	ł
17440-50-8	Copper	11.7	BI		_ <u>:P</u> _	}
17439-89-6	!Iron	1200	1		_!P_	1
7439-92-1	Lead	122	1_1	N*	E_	}
7439-95-4	Magnesium	35600	<u> </u>		12	;
7439-96-5	Manganese		1_1		_ <u>:P</u> _	AC. 64
17439-97-6	Mercury	02 20	M	X JX	BICY	DG-1189
1 <u>7440-02-0</u>	!Nickel		<u> </u>		<u> </u>	;
1 <u>7440-09-7</u>	Potassium	1980	<u> 81</u>		_ <u>:P</u> _	- A5
17782-49-2	Selenium_	1.4	<u>: U :</u>	N*		: R * 3
17440-22-4	:Silver	1.6	<u>. u :</u>		<u> </u>	;
17440-23-5	Sodium	23400	<u> </u>		<u> 1</u> P_	:
1 <u>7440-28-0</u>	: <u>Thallium</u>	1.0	<u>: u :</u>	W	LLE_	}
1 <u>7440-62-2</u>	: <u>Vanadium</u>	2.7	<u>: u :</u>		<u> </u>	:
1 <u>7440-66-6</u>	:Zinc	!7 <u>26</u> _	<u> </u>		<u> </u>	i
	Cyanide				<u> INR</u>	
	1		}		_ !	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS.. INC.

Contract: 50 00 0074

Lab Code: SILVER Case No.: 12334

SAS No.:

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

	· ··· ··· ··· ··· ··· ··· ··· ··· ···					
					!	
CAS No.	: Analyte	Concentration	ָרָ בָּיוּ	Q	: M	1
i			; i		i	i
17429-90-5	<u> Aluminum_</u>	11.5			LP_	1
1 <u>7440-36-0</u>	<u> Antimony_</u>	<u>19.9</u> _	<u>. u 1</u>		<u> </u>	!
17440-38-2	Arsenic :	2.3_	<u>. u</u>	NW	LE_	! !
17440-39-3	Barium :	14.9	<u>B</u>		<u>: P</u> _	! !
17440-41-7	Beryllium	1.1	<u> </u>		<u> </u>	;
17440-43-9	Cadmium	1.8			P	!
17440-70-2	Calcium	322000			P	<u> </u>
:7440-47-3	Chromium	2.8	: <u>U</u>		12	ŧ i
17440-48-4	Cobalt	2.6	<u> </u>		<u> </u>	! }
17440-50-8	Copper	1.9			1P	;
17439-89-6	Iron .	270	1_1		LP_	;
17439-92-1	Lead	0.90	ַנַעַ וּ	NW*	:F	1
17439-95-4	Magnesium	68700	! _ !		12	ł
17439-96-5	Manganese	94.8	1_1		18	DC 00
17439-97-6	Mercury	0.2 20	<u>: U :</u>	人工物	LCY	9-11-89
17440-02-0	Nickel	9.7	ַט :		<u> P</u>	1
17440-09-7	<u> Potassium</u>	1480	B		LP_	•
17782-49-2	:Selenium_	14.0	ַנַעַ וּ	N*	LF_	RXS
17440-22-4	Silver	1.6	ַ עַ וּ		19)
17440-23-5	:Sodium:	47500	_		<u> P</u>	;
17440-28-0	Thallium:	1.0	וַעַוּ	M	IF.	!
17440-62-2	<u> Yanadium</u>	2.7	ַ עַ		LP_	t F
17440-66-6	Zinc	190	اا		<u>: P_</u>	;
!	C <u>yanide</u>		1_1		LNR	1
; 	!	 	;;		;	;

Color Before: COLORLESS

Clarity Before: CLEAR

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC.

Contract: 68-09-0071

Lab Code: SILVER Case No.: 12334

SAS No.: 60 184

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

tevel (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

				<u>. </u>		
CAS No.	: Analyte 	: Concentration 	: C : 	: : a :	; ; M ;	t 1 1
17429-90-5	Aluminum	368	:	1	<u>: P</u>	!
17440-36-0	Antimony	19,9	U.		: 2	1 }
17440-38-2	Arsenic	9.4	₽.	NW	<u> F</u>	:
17440-39-3	:Barium	37.0	B	<u> </u>	LP_	!
1 <u>7440-41-7</u>	:Beryllium		<u>u</u>	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ 	<u> </u>	!
7440-43-9	<u>Cadmium</u>	2.6	B		<u>: P</u> _	!
1 <u>7440-70-2</u>	<u>Calcium</u>	333000	١		<u>LP</u> _	:
1 <u>7440-47-3</u>	:Chromium	2.8			<u> </u>	!
: <u>Z440-48-4</u>	:Cobalt	3.8	₽.		<u> </u>	;
1 <u>7440-50-8</u>	: <u>Copper</u>		B		<u>: P</u> _	!
<u>7439-89-6</u> _	' <u>Iron</u>	<u> 1070 </u>	¦		<u> </u>	:
7439-92-1_	Lead	<u> </u>	١		<u>LE</u>	i
1 <u>7439-95-4</u>	:Magnesium		١		<u> </u>	;
17439-96-5	: <u>Manganese</u>	2110			LP_	DC .89
17439-97-6	!Mercury		ָעֵי		TCA	। 'वना
17440-02-0	Nickel		ַ עַ		LP_	i i
17440-09-7	Potassium		₿.		12	. 485
17782-49-2	Selenium_	1.4		.,,	LE_	K#3
7440-22-4	Silver	2.4			<u> </u>	.
7440-23-5	Sodium	48400			<u> </u>	i
7440-28-0	Thallium	1.0			IF_	
7440-62-2	<u> Vanadium</u>		Π.		<u>LP</u> _	} •
<u> </u>	<u>Zinc</u>	656_			LP_	;
	Cyanide			, ,	INR	
1	·				i	i

Color Before: COLORLESS Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

FORM I - IN

Artifacts:

Comments:

7/88

12

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC.

Contract: 68-09-0071

MHP511

Lab Code: SILVER

Case No.: 12334

SAS No.: B

PC 89

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

				·		
: CAS No. 	 Analyte	 Concentration 	 C	Q	: : M :	[
7429-90-5	Aluminum	16.8	B		<u> </u>	!
17440-36-0	Antimony_	19.9	<u>: U :</u>		<u> </u>	1
: <u>7440-38-2</u>	Arsenic	5.3	8	NW	<u>:F</u>) •
: <u>7440-39-3</u>	Barium	32.1	8		<u> </u>	!
 7440-41-7	Beryllium	1.1	<u>: U</u>		:P	ł
7440-43-9	Cadmium	1.8	<u>: U :</u>		<u> </u>	l i
17440-70-2	Calcium	320000	1 _ 1		<u> P</u>	1
17440-47-3	Chromium	2.8	<u>ان</u> ا		<u> </u>	;
17440-48-4	Cobalt	2.6	: <u>U</u>		12	!
17440-50-8	Copper	1.1	ָיַט וּ		<u> </u>	;
17439-89-6	:Iron	224	l _]		18	;
7439-92-1	Lead	0.90	ı	N*	iF_	;
17439-95-4	:Magnesium	68600	_		18	;
17439-96-5	:Manganese	960	1 <u> </u>		IP_	۱
17439-97-6	Mercury	0,2 2.0	: 03	NJAS	ICY	: Bg-11-89
17440-02-0	Nickel	9.7	إلاا		<u> </u>	,
17440-09-7	Potassium	1330	B		i P	1
17782-49-2	:Selenium_	14.0	ן טו	N*	:F	:R43
17440-22-4	:Silver	1.6	: U		IP_	;
17440-23-5	Sodium	46700			18	:
17440-28-0	:Thallium	1.0	<u>ال</u> ا ا	W	IF.	:
17440-62-2	:Vanadium	2.7	וַעַ וּ		IP_	:
17440-66-6	:Zinc	295	! <u> </u>		IP.	:
	Cyanide		}		INR	1
1	!		¦ _ ;		1	;

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After:

COLORLESS

Clarity After: CLEAR

Artifacts:

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC. Contract: 68-09-0071

Lab Code: SILVER Case No.: 12334 SAS No.: DCGA3 SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med): LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	: Analyte :	Concentration	ici a	M	i
7429-90-5 <u></u>	: : <u>Aluminum</u>	106		<u> </u>	.
7440-36-0	'Antimony_	19.9	<u> </u>	<u> </u>	}
<u> 7440-38-2</u>	: <u>Arsenic</u>	8.4	BIN	<u> </u>	! !
<u> 7440-39-3</u>	: <u>Barium</u>	33.5	: <u>B:</u>	<u> </u>	ľ
<u> 7440-41-7</u>	: <u>Beryllium</u> :	1.1.	: <u>u:</u>	<u> </u>	i
7440-43-9	: <u>Cadmium</u>	1.8	: <u>u:</u>	<u> </u>	! !
7440-70-2	:Calcium_ :	303000	·	<u> </u>	}
7440-47-3	:Chromium_	2.8	<u> </u>		;
7440-48-4	: <u>Cobalt</u>	12.6_	<u> </u>	<u> </u>	<u>.</u>
<u>7440-50-8</u>	:Copper	4.9	<u> Bi</u>	!P_!	;
<u>7439-89-6</u>	: <u>Iron</u>	1090	! <u>_ </u>	<u> </u>	;
7439-92-1	! <u>Lead</u>	36.6	<u> NS*</u>	<u> </u>	ŀ
7439-95-4	! <u>Magnesium</u> :	64900	:_ <u>_</u>	<u> </u>	! !
7439-96-5_	: Manganese	950_		<u> </u>	ac ca
<u> </u>	Mercury :	0.2 20	コンプン	₩ :cv:	\$411-89
<u> 7440-02-0</u>	Nickel :	9.7	<u>u:</u>	<u>;2</u> _;	
<u> 7440-09-7</u>	: <u>Potassium</u> :	986	B!	<u>:P</u>	
7782-49-2	(<u>Selenium</u>)	14.0	: U : N*		RAS
<u> 7440-22-4</u> _	: <u>Silver</u>	1.6	lu:	<u> </u>	i
<u>7440-23-5</u>	: <u>Sodium</u>	44300	! <u>_ </u>	18	! !
	: Thallium	1.0	: U:W	<u> </u>	i
	: <u>Vanadium</u>	2.Z_	: UI	<u> </u>	ì
<u> </u>	Zinc	1332_		<u> </u>	}
	Cyanide	 		<u> INR</u>	}
		 	_	! :	:

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

INORGANIC ANALYSIS DATA SHEET

Contract: 68 03-0071

Lab Codé: SILVER Case No.: 12334

SAS No.:

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Name: SILVER VALLEY LABS., INC.

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

						
i Image No.	i 1	i Lana	i i			i
CAS No.	. Analyte	Concentration	نبان	Q	: M	i
			i <u> </u>		<u> </u>	i
: <u>7429-90-5</u>	<u> Aiuminum</u>	123.3_			<u>: 2</u> _	:
	<u>Antimony_</u>				<u> 12</u> _	;
	<u> Arsenic </u>	2.3_	: U	<u>.N</u> .	<u>ie</u>	•
: <u>7440-39-3</u>	:Barium :	·1.3_	: <u>U :</u>		<u>:P</u> _	;
<u> </u>	Beryllium:	1.1	: <u>U :</u>	+ nas ann ann ann ann	<u> </u>	:
17440-43-9	Cadmium	1.8	<u>: U :</u>		<u>: P</u>	;
17440-70-2	Calcium	154	: B !		<u>: P</u> _	:
17440-47-3	Chromium	3.5	: B :		<u> </u>	;
17440-48-4	Cobalt	2.6	: U :		:P	;
17440-50-8	Copper	1.1			; P	;
17439-89-6	!Iron	277	1		; P	:
17439-92-1	Lead	0.90	: <u>U</u> :	N*	:F	:
17439-95-4	Magnesium	42.5	B		1P	-
17439-96-5	Manganese	12.3_	<u>B </u>		<u>: P</u> _	1 AC 06
17439-97-6	Mercury	0.2 2.9	ַטַ :	NJXS	LCV	1 9-11-61
17440-02-0	Nickel	9.7	<u>: U :</u>		<u>: P</u>	}
17440-09-7	<u>Potassium</u>	273_	<u>: U :</u>		<u> </u>	! _
17782-49-2	:Selenium	1.4	: <u>U</u>	N*	LF_	: l+43
17440-22-4	Silver	1.6	<u>: U :</u>		LP_	1
17440-23-5	Sodium	68.9	: B !		LP_	1
17440-28-0	Thallium	1.0	<u>: U :</u>	W	LF_	;
7440-62-2	Vanadium	2.7	<u>اللا</u> :		: P	:
17440-66-6	Zinc	4.5	B		; P	!
	Cyanide		: <u> </u>		INR	;
1	1				!	1

Color Before: COLORLESS

Clarity Before: CLEAR

Color After:

COLORLESS

Clarity After: CLEAR

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC. Contract: 50 09 0071

Lao Code: SILVER Case No.: 12334 SAS No.:

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med): LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration		: : a	: :M::	,
7429-90-5	Aluminum	16.6	Ē.	·	<u>'</u>	! !
7440-36-0_1	Antimony !	19.9			<u> 1 P</u>	;
7440-38-2	Arsenic	12.0	!		LE_	;
7440-39-3	Barium !	1.3	Ų,		<u>: P_</u>	}
7440-41-7	Beryllium!	1.1	IJ.	! !	<u>: P_</u>	}
7440-43-9	Cadmium_ S	1.8_	<u>u</u>	, ,_ ,_ ,_ ,_ ,_ ,_ ,_ ,_ ,_ ,_ ,_ ,_	<u> </u>	1
7440-70-2:	<u>Calcium</u>	<u> </u>			12_	i
7440-47-3_1	Chromium :	2.8_			<u> </u>	i
7440-48-4	Cobalt	2.6	۱ <u>u</u>		<u> </u>	i
<u>7440-50-8</u>	Copper	4.4	8	<u> </u>	LP_	· ·
7439-89-6	Iron	219_	:)) 	LP_	ļ
<u>7439-92-1_</u> ;	Lead	0.90	¦ <u>U</u>		LE_	;
7439-95-4	Magnesium		••••		12	i
<u>7439-96-5</u> 1	<u>Manganese</u>			_ — — — — —	<u> </u>	95 "8
<u>7439-97-6</u> :	Mercury :	0.2 <u>%</u>	ıП.	BKIL		; PG-11
7440-02-0_1	Nickel :	<u>9.7_</u>			12_	ł
7440-09-7	<u>Potassium</u>				LP_	
	<u>Selenium</u>	1.4			LE_	R#8
	Silver	1.6			LP_	
7440-23-5_1	Sodium	76.0_			<u> </u>	:
	Thallium :	1.0			<u>LE</u>	
					<u> </u>	i
<u>7440-66-6</u> :	Zinc	1.3_	IJ.		<u> </u>	
!	Cyanide			(LNR	
			: 			i

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS

Clarity After: CLEAR Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC.

Contract: 68-08-00-74

Lab Code: SILVER Case No.: 12334 SAS No.:

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

 CAS No.	! ! Analyta !	 Concentration	1	 []	l IM	! !
iono No.	!	;	. C	. G	1	' !
7429-90-5	Aluminum	32.8	B	·	P	
17440-36-0	Antimony	39.3	B		<u> </u>	i
17440-38-2	Arsenic	: <u>68.6</u> _	!	N	1F	i i
17440-39-3	Barium	102	! <u>B</u>	<u> </u>	<u>:P</u>	}
7440-41-7	Beryllium:	; <u>1.1</u>	IJ.		<u>:P</u>	;
17440-43-9	:Cadmium	4.6	<u>B</u>	<u> </u>	<u> </u>	:
1 <u>7440-70-2</u>	Calcium_	180000	!		LP_	!
17440-47-3	Chromium	2.8	٠ <u>U</u>		1P	1
17440-48-4	Cobalt	8.8	: B		;P	1
17440-50-8	Copper	13.6	: <u>B</u>	<u> </u>	<u>:P</u>	;
17439-89-6	Iron	:267_	!	<u> </u>	;P	;
17439-92-1	Lead	41.8	1	N*	iE_	1 •
17439-95-4	Magnesium	38000	!	1	<u> </u>	;
7439-96-5	'Manganese	2780	١ <u> </u>	1	IP.	
7439-97-6	Mercury	0.2 2.4	١ <u>Ų</u>	え T を	LCY	DC 19
1 <u>7440-02-0</u>	Nickel	19.7_	١ <u>U</u>	<u> </u>	LP_	1
17440-09-7	<u>Potassium</u>	! <u>5580</u> _	١	! !	<u> </u>	}
: <u>7782-49-2</u>	Selenium_	14.0	١ <u>U</u>	!N*	LE_	IR 43
17440-22-4_	Silver	11.6_	١ <u>U</u>	!	12	ŧ
: <u>7440-23-5</u>	Sodium	54600	i		<u> </u>	I
: <u>7440-28-0</u>	Thallium	14.1	١		LE_	1 1
: <u>7440-62-2</u>	<u> Yanadium</u>	!2.7_	ָּעַ :		<u> </u>	.
1 <u>7440-66-6</u>	Zinc	<u> 2650</u>	١	 	<u> </u>	<u> </u>
! !	Cyanide	·	١		INR	ŀ
!	1	·	!_	!	!	;

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC. Contract: 60 007

Lab Code: SILVER Case No.: 12334 SAS No.:

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med): LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

: CAS No.	: Analyte	: Concentration: 	C	i a	i M	Lob didn
7429-90-5	: Aluminum	30900	i i		ip	nuttiply by
7440-36-0	Antimony	23alp = 337		ASOF	<u> </u>	se sa Thaten he
7440-38-2		CHIEF SOLO			17-	que auto
<u> 7440-39-3</u>		<u>2330_</u>		 	<u> </u>	90/ >
7440-41-7	Beryllium	1.7	₽.		<u>: P</u>	!
7440-43-9	:Cadmium_	289			<u>: P</u> _	:
7440-70-2	:Calcium	446000	<u> </u>		<u>; P</u>	1 1
7440-47-3	Chromium	50.2			12	1
7440-48-4	Cobalt	48.7	B		<u> </u>	1 1
7440-50-8	Copper	1540			; P	1
7439-89-6		107000			P	1
7439-92-1	Leac	22100			P	丁相
7439-95-4	Magnesium	104000			P	:
	Manganese				<u> </u>	
7439-97-6		16.0 16.4		EAT N	ICV	DG-12-89
<u>7440-02-0</u>	Nickel	<u> </u>			<u>: P</u>	1
7440-09-7	Potassium	15600	_		12_	14 7.00
7782-49-2	:Selenium	1.2 761	<u>U</u>	W 7左	TYF	10 KM R 18
7440-22-4	Silver	201			12	, 4 · ·
7440-23-5	Sodium	58500			iP_	1
7440-28-0	Thallium	83.4		 	F	T 18
7440-62-2	' <u>Vanadium</u>	58.7			16	1
7440-66-6	Zinc	49100			:P	!
	Cyanide				INR	1
	1				1	!

Color Before: BROWN

Clarity Before: CLOUDY Texture:

Color After: BROWN

Clarity After: CLOUDY Artifacts:

EPA SAMPLE NO.

1 INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC.

Contract: 60 03 007

Lab Code: SILVER

Case No.: 12334

SAS No.:

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

ievel (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	: Analyte :	 Concentration	C	a	: M 	
7429-90-5	i	32.6	a.		; ;	i
					; P	! !
	Antimony_					
	<u>Arsenic</u>	10.7				丁粉
	<u>Barium</u>	37.0			<u>: P</u> _	
: <u>7440-41-7</u>	Beryllium				<u> </u>	
: <u>7440-43-9</u>	Cadmium :	3.3_	B	 	<u> </u>	
: <u>7440-70-2</u>	Calcium	<u> </u>		<u> </u>	P	
17440-47-3	Chromium	2.8	U		! P	
7440-48-4	Cobalt	2.6	Ü	ļ	, P	
17440-50-8	Copper	12.4	B	!	; P	
	Iron	416	;		i P	
	Lead	12.9		N*	F	!
	:Magnesium	61600			[P]	•
: <u>7439-96-5</u>	Manganese	1310			12_	
1 7439 -97-6	Mercury	0.2 2.0	U.	タ「メ	CV	189-11-87
17440-02-0	Nickel	25.8	B		۱,	•
7440-09-7	Potassium	273_	U		<u> </u>	•
17782-49-2			U	N*	F_	R 48
7440-22-4	Silver	1.6	U.		12	
7440-23-5	Sodium	28800			<u> </u>	
17440-28-0	Thallium	1.0	U		F.	!
7440-62-2	Vanadium	2.7	Ū		<u> </u>	}
: <u>7440-66-6</u>	Zinc	2990	·		IP.	•
!	Cyanide				INR	•
}]		;	,

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR Artifacts:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC. Contract: 62-03-007

Lab Code: SILVER Case No.: 12334 SAS No.:

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med): LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS	No.	: Analyte	 Concentration 	C	Q .	i ! M !	i ; ;
7429	90-5	Aluminum	33.7	B		P	, ,
17440	7-36-0	Antimony	19.9			[P	;
17440	-38-2	Arsenic	17.4			: E	EKT
17440	-39-3	Barium	35.9	B		<u> </u>	;
17440)-41-7	Beryllium	1.1	١Ū		<u> </u>	<u> </u>
17440)-43-9	Cadmium	6.2	[l P	
17440	70-2	Calcium	314000	_		<u>: P</u>	;
17440		Chromium	2.8	: <u>Ū</u>		P	1 •
17440)-48-4	Cobalt	2.8	ı U		<u> </u>	}
17440	-50-8	Copper		B		LP_	ŀ
17439	9-89-6	Iron	696			<u> </u>	;
17439	9-92-1	Lead	24.9	اا	N*	LE_	;
17439)-95-4	Magnesium	62700	!		12_	ł
17439	9-96-5	Manganese	1340	١	<u>.</u>	<u> </u>	0 C .6
17439	9-97-6	Mercury	0280	Ц.	SKT N	LCY	DG-1-89
17440	0-02-0	Nickel	9.7	<u>u</u>		<u> </u>	:
17440)-09-Z	<u>Potassium</u>	273	١ <u>Ų</u>		LP_	1 2 20
17782	2-49-2	Selenium	14.0	١ <u>Ų</u>	<u>N*</u>	LE_	: R *8
17440	2-22-4	Silver	1.6_	<u>: U</u>		<u> </u>	;
17440	<u>2-23-5</u>	Sodium	29300_	١		<u> 12</u>	:
17440	<u>2-28-0</u>	Thallium_	1.0	ιŲ.		LE_	{
17449	<u> 2-62-2</u>	<u> Vanadium</u>		ij		LP_	i
17440	<u>2-66-6</u>	Zinc	3060	١		LP_	
!		Cyanide) 	<u> </u>		INR	1
;] 	!	·	i	i

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

INORGANIC ANALYSIS DATA SHEET

Lab Name: SILVER VALLEY LABS., INC.

Contract: 68-09-00

Lab Code: SILVER Case No.: 12334

SAS No.:

PC 184

SDG No.: MHL955

Matrix (soil/water): WATER

Lab Sample ID:

Level (low/med):

LOW

Date Received: 08/16/89

% Solids:

0.0

Concentration Units (uq/L or mg/kg dry weight): UG/L

ICAS No.	 Analyte	 Concentration		M	
7429-90-5		17.6		P	
	Antimony_		:U: :U:NW	-나무_ :	, 1
1 <u>7440-38-2</u> 17440-39-3	A <u>rsenic</u> Barium	14.9		- <u> F</u>	! !
	Beryllium		, <u>2,</u>	-;;;	1
	Cadmium	1.8	·	P	<u> </u>
	Calcium	316000		iP	}
	Chromium	2.8	U	TP :	}
17440-48-4	Cobalt		:UI	<u> </u>	i i
17440-50-8	Copper	10.4	:B1	; P	<u> </u>
17439-89-6	Iron	426	1_1	<u>:P_</u>	i
: <u>7439-92-1</u>	! <u>Lead</u>	1.8	:U!N*	LE_	•
	:Magnesium	. — — — — — — — — — — — — — — — — — — —	<u> </u>	LP_	1
	: <u>Manganese</u>		1_1	<u>: P</u>	Mc ca
	Mercury			31CA	4-11-89
	Nickel		<u>B </u>	<u></u>	! !
	Potassium		BI	<u>- i P</u> _	0 10
	Selenium_	14.0		iE-	1 AS
17440-22-4 17440-22-4	Silver	1.6		<u>- ‡ P</u> _ :	i •
	Sodium	: <u>45000</u> _	; <u> </u>	<u> </u>) •
1 <u>7440-28-0</u>	Thallium		<u>: U:</u>	<u> </u>] j
: <u>7440-62-2</u> : 7440-66-6	<u>Vanadium</u> _	2.7 219	' <u>ui</u> ' '	<u>; P</u>	! •
1777770000	<u>Zinc</u> Cyanide		' 1 ! !	INR	! !
1	; GTENTAETT		'- <u>-</u>	1317	! !
·	·		· ·	- ' '	1

Color Before: COLORLESS

Clarity Before: CLEAR

Color After: COLORLESS

Clarity After: CLEAR

Artifacts: